RRC Group D Previous Year Paper 43 (Held On: 22 Oct 2018 Shift 2)

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

Take this paper as a timed mock test

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

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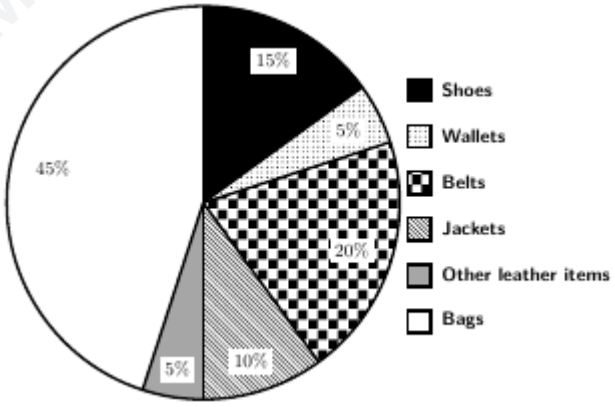
Scan the QR code or click the link to open it.

CBT

Q1. Molecular mass of CO is _____.

(a) 16
(b) 44
(c) 32
(d) 28

Q2. The following pie diagram shows the revenue of the company ABC, which manufactures leather products. The total revenue of the company for the year 2015 was Rs. 36,28,000



Among the products, which product gave the major source of revenue (largest revenue making product) to the company?

(a) Belts
(b) Wallets
(c) Shoes
(d) Bags

Q3. Keerthana says, ‘Jyothi’s father Revanth is the only son of my father-in-law Mohan. Brunda is Jyothi’s sister”. Brunda related to Mohan?

(a) Daughter
(b) Daughter-in-law
(c) Grand daughter
(d) Niece

Q4. 1 Newton = ?

(a) 1 kg m s^{1}
(b) 1 kg m s^(-1)
(c) 1 kg m s^(-2)
(d) kg m s2

Q5. Find the rotated image of the given figure.



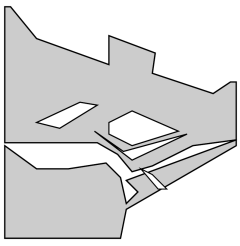
(a)



(b)



(c)



(d)



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Q6. Which of the following states won the best tableau prize in the 2018 Indian Republic Day parade ?

(a) Maharashtra
(b) Assam
(c) Kerala
(d) Punjab

Q7. 35 – 7.892 + 0.005 – 10.345 = ?

(a) 26.768
(b) 29.768
(c) 16.768
(d) 19.768

Q8. Choose the person who does NOT belong to the group.

(a) Rukmini Arundale
(b) Sania Mirza
(c) Birjumaharaj
(d) Mrinalini Sarabhai

Q9. The difference between two fractions is 5 / 6. The smaller one is 3 / 4. What is the other fraction?

(a) 1 / 12
(b) 19 / 24
(c) 8 / 10
(d) 19 / 12

Q10. _____ is the most metallic element in the fifth period

(a) Rubidium
(b) Calcium
(c) Gold
(d) Platinum

Q11. The ideas of introducing Liberty and Fraternity in the Constitution of India were inspired by which country ?

(a) France
(b) Germany
(c) USA
(d) Russia

Q12. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(s) from the statements(S).

Statements:

World is neither fair nor unfair. It's just the people's state of mind.

Conclusions:

1. Some people find world to be fair.
2. Some people find world to be unfair.

(a) Neither 1 nor 2 follows.
(b) Only conclusion 2 follows.
(c) Both 1 and 2 follow.
(d) Only conclusion 1 follows.

Q13. In each question below is given a statement followed by 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 would like to do 500 numbers sampling to check the reliability of this test.' X says to Y.

Assumptions:

I. The sampling on 500 numbers is possible.

II. X possess skills and competencies to do such sampling.

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

Q14. Which of the following statements is/are true about the speed of sound in different media at 25°C

A. In steel, the speed of sound is 5960 m/s

B. In nickel, speed of sound is 6240 m/s

(a) Only A is true
(b) Both A and B are true
(c) Neither A nor B is true
(d) Only B is true

Q15. Find the angle formed by the hour and minute hand when the time is 3:25

(a) 32°
(b) 65°
(c) 47.5°
(d) 54°

Q16. Which 2017 book is a standalone fantasy about a young princess, Gauri, who has to work with her sworn enemy. Vikram, to win back her kingdom ?

(a) 'A Crown of Wishes'
(b) 'The Fated Encounter'
(c) 'The Star-Touched Queen'
(d) 'The Solitary Insurgence of a Princess'

Q17. Sandhya and Vanita are facing East direction Sandhya turns 45° Anticlockwise and then in 135° Clockwise direction. With how much turn or rotation Sandhya will be facing in opposite direction to Vanita.

(a) 180° CW
(b) 180° ACW
(c) 270° ACW
(d) 270° CW

Q18. A statement is followed by two arguments. Decide which of the arguments is/are strong with respect to the statement.

Statement:Should LED lamps be banned?

Arguments:

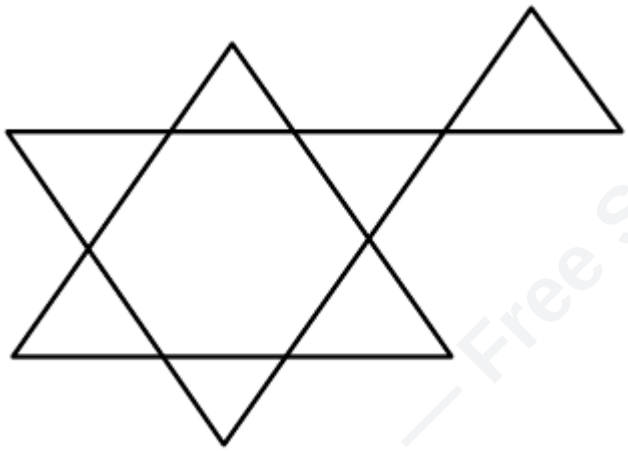
I. Yes, they emit blue light which is hazardous to the environment as well as human beings.

II. No, they are economical and better light than CFL's.

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

Q19. Find the number of triangles in the given figure:

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(a) 6
(b) 7
(c) 8
(d) 9

Q20. The work done across two points having a potential difference of 20 V is 60 J. Then the electric charge flowing between the two points is:

(a) 30 C
(b) 3 C
(c) 1200 C
(d) 120 C

Q21. Find the next (?) number in the series.

1200, 600, 200, ?, 10

(a) 180-
(b) 150
(c) 100
(d) 50

Q22. Pradhan Mantri Krishi Sinchayee Yojana is launched by the Indian Government recently for which purpose ?

(a) Coal & renewable energy
(b) Animal husbandry
(c) Electricity
(d) Agriculture & irrigation

Q23. When a body is taken from the equator to the North and South poles then its weight:

(a) remains the same
(b) increases at south pole and decreases at north pole
(c) decreases
(d) increases

Q24. The vas deferens unites with a tube coming from the _____ to form a common passage called the urethra.

(a) prostate gland
(b) testis
(c) scrotum
(d) urinary bladder

Q25. The fumes of NO2 are _____ in colour.

(a) yellow
(b) brown
(c) pale yellow

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(d) red

Q26. Aditya is the son of Dinesh. Dinesh is the brother of Avani. Lata is the daughter of Avani. Lata and Aditya are _____.

(a) nephew
(b) brothers
(c) cousins
(d) niece

Q27. Pb + CuCl2 → PbCl2 + Cu. The given reaction is an example of a _____ reaction.

(a) decomposition
(b) double displacement
(c) combination
(d) displacement

Q28. Two pipes X and Y can fill a tank in 60 minutes and 75 minutes respectively. There is also an outlet Z. If all the three pipes are used together, the tank is full in 50 minutes. How much time will be taken by Z to empty the full tank?

(a) 90 minutes
(b) 100 minutes
(c) 50 minutes
(d) 75 minutes

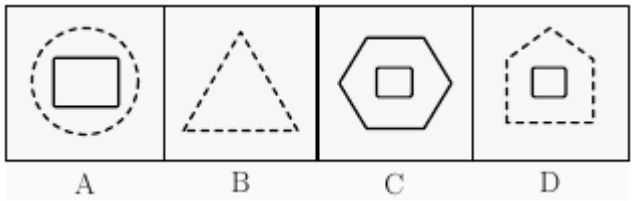
Q29. How many Isomers does C6 H14 have?

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

Q30. Which cricket team won the 2017 Ranji Trophy tournament ?

(a) Tripura
(b) Assam
(c) Saurashtra
(d) Vidarbha

Q31. Choose the one which does not belong to the group.



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

Q32. Covalently bonded molecules have low melting and boiling points because:

(a) Intermolecular forces are medium
(b) Intermolecular forces are strong
(c) Intermolecular forces are very strong
(d) Intermolecular forces are weak

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Q33. In the Mendeleev periodic table, gaps were left for the undiscovered elements. Which of the following elements found a place in the periodic table later ?

(a) F
(b) Mg
(c) Ge
(d) Ca

Q34. The interest earned on a sum of money invested for six years at the rate of 9.5% simple interest per annum was Rs. 456. What was the sum invested?

(a) Rs. 775
(b) Rs. 850
(c) Rs. 750
(d) Rs. 800

Q35. India-born Vikas Sathaye recently won an Oscar award. In which category did he win the Oscar ?

(a) Sound recording
(b) Film Editing
(c) Best Supporting Actor in the film 'Newton'
(d) Invention of an innovative movie camera

Q36. The protuberances that extend from the lower epidermal cells of Bryophytes are called_____.

(a) Thallus
(b) Seta
(c) Rhizoids
(d) Capsule

Q37. Consider the given questions and decide which of the following statements is sufficient to answer the question.

How much was the sale of the company ABC?

Statements:

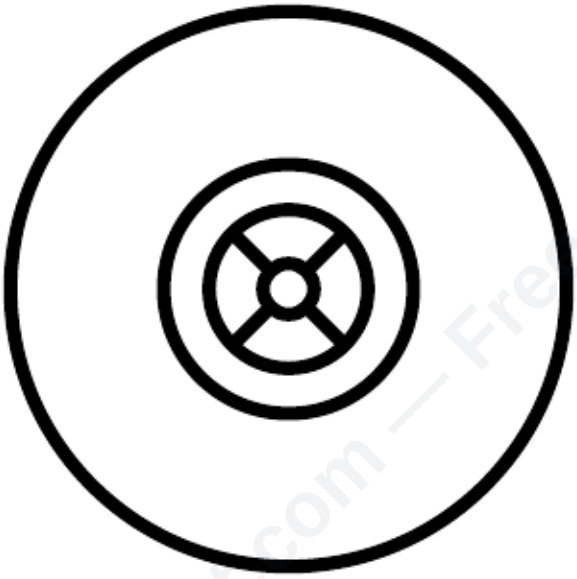
1. The company ABC sold 75000 units of soaps each at Rs. 70/-
2. ABC has no other products in the production line.

(a) I alone is sufficient while 2 alone is not sufficient to answer the question.
(b) Both 1 and 2 are sufficient to answer the questions.
(c) Neither 1 nor 2 is sufficient to answer the question.
(d) 2 alone is sufficient while 1 alone is not sufficient to answer the question.

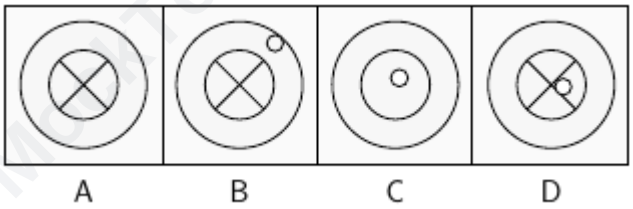
Q38. Which of the option figures bears the closest resemblance to the question figure?

Question Figure:

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Option Figures:



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

Q39. 91 ÷ [- 4 + (-3) of {27 ÷ (-18 ÷ -2)}] = ?

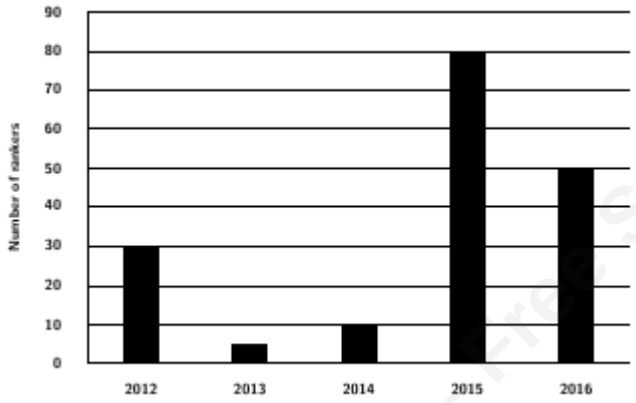
(a) -13
(b) -7
(c) 13
(d) 7

Q40. A car starting from rest move with uniform acceleration of 1 ms^(-2) for 2 minutes. Find the speed acquired by the car.

(a) 120 ms^{1}
(b) 120 ms^(-2)
(c) 120 ms^(-1)
(d) 120 ms^{2}

Q41. The following Bar graph shows information of the results in the national level entrance exam by the institute “ABC” for the last 5 years.

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In which year institute ABC scored least number of ranks?

(a) 2011
(b) 2014
(c) 2013
(d) 2012

Q42. Find the value of 'A' when the polynomial $P(x) = x^3 + 3x^2 - 2Ax + 3$, where 'A' is a constant, is divided by $x^2 + 1$ has a remainder equal to – 5x:

(a) -2
(b) 2
(c) -3
(d) 3

Q43. If in a triangle angle B = 90° and angle A = 30°, then 2sin2A – cos2A – tan2A = ?

(a) 1/6
(b) -1/2
(c) 1
(d) -1/3

Q44. P 2 R I M J 3 Q % W @ / N $ E 5 X Y 1 # 8

Using the above series, find the term DOES NOT belong to the group below:

P I 3, W N 5, % / 5, M Q @

(a) W N 5
(b) M Q @
(c) P I 3
(d) % / 5

Q45. Suresh bought two books for Rs. 1,200. He sold one at a profit of 20% and the other at a loss of 16%. If the selling prices of both the books are the same, then find the approximate cost price of each book.

(a) Rs. 550 and Rs. 650
(b) Rs. 500 and Rs. 700
(c) Rs. 600 and Rs. 600
(d) Rs. 400 and Rs. 800

Q46. What is the weight of the human brain in grams ?

(a) 120 - 140
(b) 250 - 300
(c) 1800 - 2000
(d) 1200 - 1400

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Q47. Which of the following sets of atomic numbers belong to that of alkali metal ?

(a) 12, 20, 88, 56
(b) 9, 17, 35, 53
(c) 37, 19, 3, 55
(d) 1, 3, 5, 45

Q48. Which of the below is such a largest number that leaves a remainder of 9 when it divides 105 and leaves a remainder of 20 when dividing 164?

(a) 48
(b) 36
(c) 96
(d) 24

Q49. Moorti Devi Award is given for excellence in the field of -

(a) Literature
(b) Drama
(c) Dance
(d) Music

Q50. Chandra Shekhar Azad was born in which state?

(a) West Bengal
(b) Uttar Pradesh
(c) Bihar
(d) Madhya Pradesh

Q51. Evaluate the following expression:

$36 – 2(20 + 12 \div 4 \times 3 – 2 \times 2) + 12 = ?$

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

Q52. 37.5% of an alloy was silver. If in the quantity of alloy there was 117 gm of silver, what was the quantity of the other elements in the alloy?

(a) 273 gm
(b) 195 gm
(c) 312 gm
(d) 156 gm

Q53. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(S) from the statement(s).

Statement:

The quote says, “It’s better to be a lion for a day than a sheep all your life.”

Conclusions:

I. Lion is majestic, whereas a sheep follows its herd

II. Like sheep, we shouldn’t blindly and meekly follow others

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

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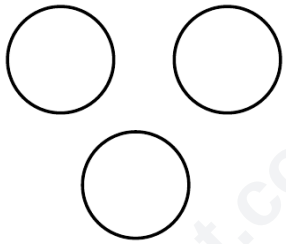
Q54. X, Y and Z bought a field on an annual rent of Rs. 415. If X grazed 25 cows for 6 months, Y grazed 40 cows for 8 months and Z grazed 30 cows for a complete year, what was the share of the rent given by Y?

(a) Rs. 154
(b) Rs. 120
(c) Rs. 160
(d) Rs. 150

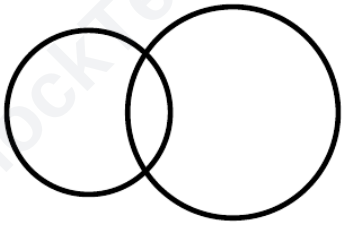
Q55. Identify the diagram that best represents the relationship among the given classes.

Bat, Hockey Stick, Wood

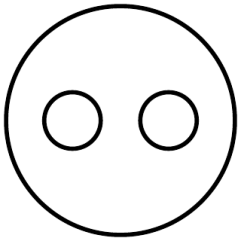
(a)



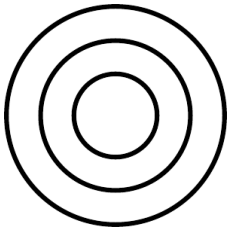
(b)



(c)



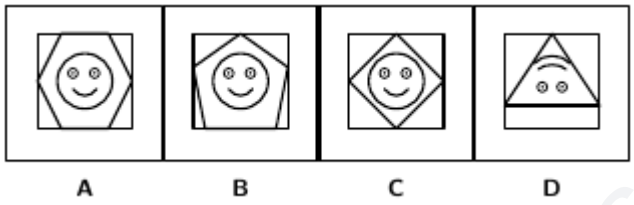
(d)



Q56. Identify the unisexual flower.

(a) Petunia
(b) Corn
(c) Rose
(d) Mustard

Q57. Find the odd one out:



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

Q58. Who has taken over charge as the new IGP of Armed Police Kashmir Range ?
(a) Munir Ahmad Khan
(b) G S Mailk
(c) Shivanand Jha
(d) Swayam Prakash Pani

Q59. A tank is filled up in 6 hours by three pipes X, Y and Z together. If Z is thrice as fast as Y and Y is twice as fast as X then find the time required in hours to fill up the tank by pipe X alone?
(a) 30 hours
(b) 54 hours
(c) 27 hours
(d) 45 hours

Q60. The value of 5 / 3 + 3 / 5 is:
(a) 8 / 15
(b) 8 / 8
(c) 15 / 8
(d) 24/15

Q61. If P means ×, R mean +, T means ÷ and S means -, then what is the value of 35T5P6S4R3 = ?
(a) 25
(b) 40
(c) 32
(d) 41

Q62. The chemical formula of sodium sulphate is:
(a) Na2SO4
(b) NaSO3
(c) NaSO4
(d) Na(SO4)2

Q63. The value of two adjacent angles of a quadrilateral are 125° and 35° and the other two angles are equal. Find out the value of equal angles.
(a) 135°
(b) 80°
(c) 100°
(d) 90°

Q64. If in a certain language ANGRY is coded as BOHSZ, how is ASSIGN coded in that language?
(a) TJOBTH
(b) JTTHOB
(c) BTJOHT
(d) BTTJHO

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Q65. A football team scored the following number of goals over 6 matches. Based on the following table, what is their average score in a game?

Games	Number of goals
Game 1	2
Game 2	1
Game 3	0
Game 4	4
Game 5	3
Game 6	2

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

Q66. Four words have been given below of which three are alike in sone way and one is different. Choose the odd one out.
(a) HDFC Bank
(b) Yes Bank
(c) AXIS Bank
(d) SBI Bank

Q67. Who is the chairman of NABARD as of July 2018 ?
(a) Raghuram Rajan
(b) Dr. Harsh Kumar Bhanwala
(c) Bibek Debroy
(d) Subramanian Swamy

Q68. Who among the following won the Best Actor award at the Indian Film Festival of Melbourne (IFFM), 2017 ?
(a) Sushant Singh Rajput
(b) Shahid Kapoor
(c) Varun Dhawan
(d) Aamir Khan

Q69. A certain household has consumed 9 × 10^8 joules of energy in a month. Find the energy in units?
(a) 250 units
(b) 2500 units
(c) 25 units
(d) 0.25 units

Q70. Who was the first captain of the Indian women’s cricket team ?
(a) Harmanpreet Kaur
(b) Shantha Rangaswamy
(c) Jhulan Goswami
(d) Mithali Raj

Q71. In triangle ABC, find the value of $\tan^2 A/2 + \tan^2 B/2 + \tan^2 C/2$.
(a) ≤ 1
(b) > 1
(c) ≥ 1
(d) < 1

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Q72. Which of these is the softest mineral ?

(a) Diamond
(b) Talc
(c) Toothpaste
(d) Marble

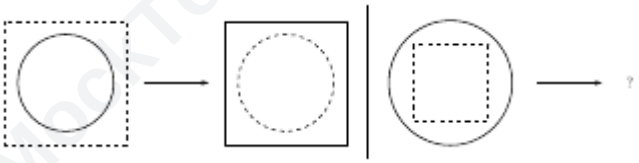
Q73. Which of the following is an example of connective tissue ?

(a) Vascular bundles
(b) Bark of tissue
(c) Bone
(d) Skin

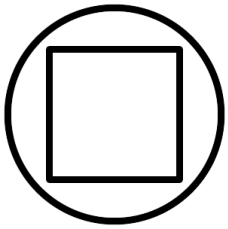
Q74. Relative density is equals to:

(a) density of a substance / density of oil.
(b) density of a substance / density of water.
(c) density of a component of the substance / density of total substance.
(d) density of a water / density of a substance.

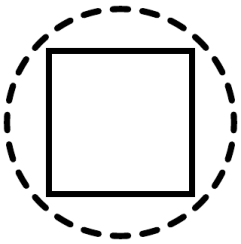
Q75. The correct picture that fits the blank space is:



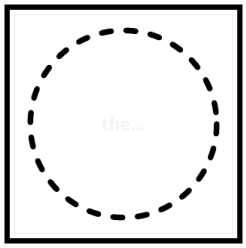
(a)



(b)

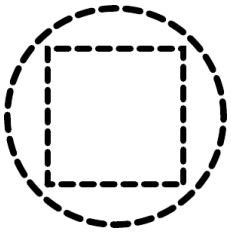


(c)



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(d)



Q76. What is the second capital of Himachal Pradesh?

(a) Dharamshala
(b) Mandi
(c) Solan
(d) Chamba

Q77. Find half the value of 'S':

If S = 6 + [(16 – 4) ÷ (2^2 + 2)] - 2

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

Q78. Out of 60 customers, 10 chose service 1 and 2, 15 chose service 2 and 3 and 5 chose service 1 and 3, 15 chose only service 2. 20 chose service 1, 35 chose service 2, and 30 chose service 3. How many chose all the three services?

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

Q79. The demonetised currency in India accounted for how much percentage of the country's total cash value ?

(a) 95%
(b) 79%
(c) 86%
(d) 78%

Q80. In 2017, what was the best world ranking secured by India according to the FIFA world ranking ?

(a) 90^(th)
(b) 99^(th)
(c) 95^(th)
(d) 96^(th)

Q81. The gravitational potential energy of an object at a point above the ground is defined as the work done in _____.

(a) keeping it at the centre
(b) applying gravitational force on it
(c) raising it from the ground to that point against gravity
(d) allowing it to stand on the ground against gravity

Q82. Evaluate

$((469 + 174)^2 - (469 - 174)^2)/((469 \times 174))$

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

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Q83. Find the energy possessed by an object of mass 11 kg when it is at a height of 7 m above the ground. Given g = 9.8 ms^(-2).

(a) 528 J
(b) 754.6 J
(c) 588 J
(d) 520 J

Q84. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(s) from the statement(s).

Statements:

I. No metals are red.

II. Some red are danger

Conclusions:

1. Some danger are metals.

2. Some red are metals.

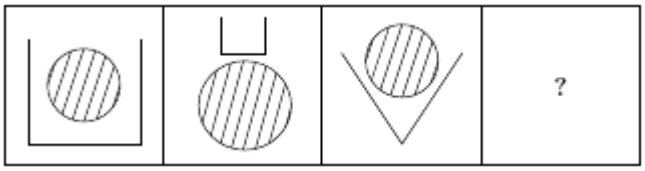
(a) Conclusion 2 alone follows.
(b) Conclusion 1 alone follows.
(c) Neither 1 nor 2 follows.
(d) Both 1 and 2 follows.

Q85. A tank can be filled by two taps, A and B in 12 hours and 16 hours, respectively. The full tank can be emptied by a third tap C in 8 hours. If all the taps are turned on at the same time, then how much time I needed to fill the empty tank completely?

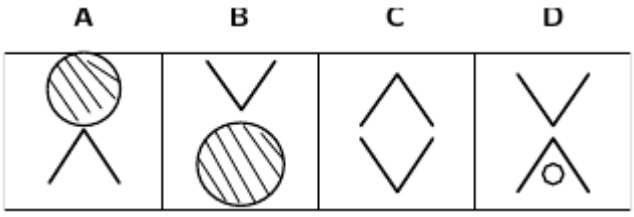
(a) 16 hours
(b) 40 hours
(c) 48 hours
(d) 24 hours

Q86. Identify the figure that will complete the given series.

Problem figures:



Answer figures:



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

Q87. I-tsing, a Chinese traveller, stayed at _____ for three years and learned Sanskrit.

(a) Patliputra
(b) Tamralipti
(c) Bodh Gaya
(d) Nalanda

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Q88. The ratio of the length and breadth of a rectangular farm is 4 : 3. If the area of the farm is 1452 m², find the cost of fencing the boundary of the farm at the rate of Rs. 12 per meter.

(a) Rs. 1,868
(b) Rs. 1,845
(c) Rs. 1,858
(d) Rs. 1,848

Q89. At 9 am, a train starts from Station A towards Station B at 70 km per hour. After 2 hours, another train starts from Station B towards Station A at 20 km per hour. If the distance between the two stations is 320 km, then at what time do the trains meet?

(a) 11 am
(b) 1 pm
(c) 3 am
(d) 2 pm

Q90. Who was the first king of the Pala Dynasty?

(a) Nandlala
(b) Devapala
(c) Madanapala
(d) Gopala

Q91. Which of the following statements is/are true/false?

A. An ion is a charged particle and can be negatively or positively charged. A negatively charged ion is called an anion and a positively charged ion, a cation

B. An ion is a charged particle and can be negative or positively charged. A negatively charged ion is called a cation. And a positively charged ion, an anion.

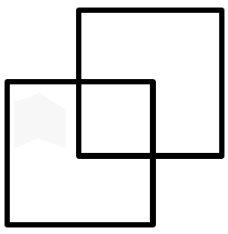
(a) A and B are both false
(b) Only A is true
(c) A and B are both true
(d) Only B is true

Q92. The distance between two stations is 380 km. Two trains start simultaneously from these stations on parallel tracks to cross each other. The speed of one of them is greater than the other by 7 km / h. If the distance between the two trains after 2 hours of their start is 126 km, find the speed of each train.

(a) 75 km / h, 82 km / h
(b) 58 km / h, 65 km / h
(c) 67 km / h, 60 km / h
(d) 55 km / h, 62 km / h

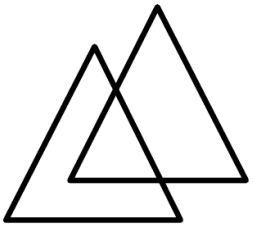
Q93. Identify the odd one from the given group of figures.

(a)



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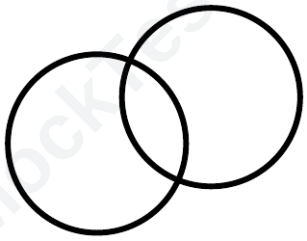
(b)



(c)



(d)



Q94. The mean of three numbers was 15, the range of the data was 9. The difference between the largest and the middle number was twice that between that middle number and the least one. The largest of the three numbers was

(a) 19
(b) 22
(c) 21
(d) 20

Q95. Which of the following Indian State Political parties is led by N. Chandra Babu Naidu ?

(a) All India Forward Bloc
(b) Telugu Desam Party
(c) Aam Aadmi Party
(d) Asom Gana Parishad

Q96. The relation between the focal length and radius of curvature of a mirror is:

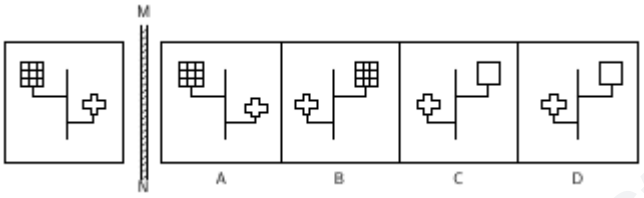
(a) F=2
(b) R = f
(c) R = 2f
(d) R = f/2

Q97. A 300 m long train crosses a platform in 39 seconds while it crosses a single pole in 18 seconds. What is the length of the platform?

(a) 680 m
(b) 320 m
(c) 350 m
(d) 650 m

Q98. Choose the mirror image for the following figure:

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

Q99. _____ is the capital of Jharkhand
(a) Simdega
(b) Ranchi
(c) Hattiya
(d) Patna

Q100. At the time of marriage, a man was 6 years older than his wife, but after 12 years of marriage, his age is 1.2 times that of his wife. What were their ages at the time of their marriage?
(a) 24 years, 18 years
(b) 27 years, 18 years
(c) 21 years, 18 years
(d) 23 years, 19 years

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (d) 28

The correct answer is 28.

Key Points

• The molecular mass of CO is 28. CO is called Carbon monoxide. Carbon monoxide is a colourless and tasteless flammable gas that is slightly less dense than air.

• The density of Carbon monoxide is 1.14 kg/m³. Its melting point is -205 °C and boiling point is -191.5 °C.

• The molar mass is the mass of a given chemical element or chemical compound (g) divided by the amount of substance (mol).

• The unit of molar mass is Kilogram per mole.

Additional Information

• The molecular mass of CO2 is 44. Carbon dioxide is a colourless gas with a density of about 53% higher than that of dry air. Its boiling point is -78.46 °C.

• The molecular mass of CH4 is 16. Methane is a chemical compound with the chemical formula CH4. It is a group-14 hydride and

the simplest alkane. Its boiling point is -161.6 °C.

Q2. Answer: (d) Bags

Given:

From the given graph we can say that,

Revenue earn by shoes = 15%

Revenue earn by wallet = 5%

Revenue earn by belts = 20%

Revenue earn by jackets = 10%

Revenue earn by other items = 5%

Revenue earn by bag = 45%

Therefore Maximum revenue earned by bag

Q3. Answer: (c) Grand daughter

According to given conditions,

Hence, Brunda is ‘granddaughter’ of Mohan.

Q4. Answer: (c) 1 kg m s^(-2)

The correct answer is 1 kg m s-2

Key Points

• Newton is the SI unit of force. And force equals the product of mass and acceleration.

• SI unit of force = Newton

• SI unit of mass = kg

• SI unit of acceleration = m.sec^(-2).

• Hence, 1 Newton is equals to, kg m.sec^(-2 .)the other units do not satisfy the unit of Newton.

Q5. Answer: (d) [figure]

Option 1: Same as question figure.

Option 2: Not a rotated image.

Option 3: Not a rotated image.

Option 4: It is a rotated image.

The rotated image of the given figure is shown below:

Hence, ‘option 4’ is the correct answer.

Q6. Answer: (a) Maharashtra

The correct answer is Maharashtra.

Key Points

• Maharashtra won best tableau prize in the 2018 Indian Republic Day Parade. Tableau represents mystical event Heritage culture development program and environment.

• The first Republic Day Parade was held on 2 January 1950. Defence Minister Nirmala Sitharaman presented the award to the winner state. The tableau from Maharashtra won the first price, depicting the coronation Chhatrapati Shivaji Maharaj at the Republic Day parade at the Rajpath in New Delhi.

Additional Information

• Assam state won the best tableau prize in the 2020 Indian Republic Day Parade. Defence Minister Rajnath Singh gave the best value award for Republic Day parade in New Delhi. The tableau of Assam was based on the theme land of unique craftsmen ship and culture. Assam was the best-named tableau among all the 16 states and union territory participating in the Republic Day parade 2020.

• After Maharashtra and West Bengal Kerala’s proposal has been denied permission for Republic Day Parade on 26 January 2018. Kerala proposed a team comprising the traditional art from Satyam and Kala Mandalam art and architecture of the Kerala state.

• Punjab has won the third tableau prize on the theme of Jallianwala Bagh massacre. Punjab proposed a float highlighting Jallianwala Bagh massacre that took place on April 13, 1919.

Q7. Answer: (c) 16.768

Considering the given equation,

35 – 7.892 + 0.005 – 10.345 = ?

=> 35.005 – 18.237 = ?

=> 16.768

Therefore ? = 16.768

Q8. Answer: (b) Sania Mirza

All persons except ‘Sania Mirza’ are Indian dancers, while ‘Sania Mirza’ is Indian Tennis player.

Hence, ‘Sania Mirza’ is the odd one out.

1) Rukmini Arundale → Rukmini Devi Arundale was an Indian theosophist, dancer and choreographer of the Indian classical dance form of Bharatanatyam.

2) Sania Mirza → Sania Mirza is an Indian professional tennis player.

3) Birjumaharaj → Brijmohan Mishra, popularly known as PanditBirjuMaharaj, is an exponent of the Handia, Allahabad Kalka-Bindadingharana of Kathak dance in India.

4) Mrinalini Sarabhai → MrinaliniVikram Sarabhai was an Indian classical dancer, choreographer and instructor.

Q9. Answer: (d) 19 / 12

Given:

First fraction = 3 / 4

Difference between two fraction = 5 / 6

Calculation:

Let the other fraction be x

According to question:

=>x - 3 / 4 = 5 / 6

=> x = 5 / 6 + 3 / 4

=> LCM of 4, 6 = 12

=> x = (10 + 9) / 12

=> x = 19 / 12

Therefore Other fraction is 19 / 12

Q10. Answer: (a) Rubidium

The correct answer is Rubidium.

Key Points

• Rubidium is a metallic character that decreases across a period. Rubidium is the first element of V group of most metallic. It is an alkali metal. It is the most reactive group in the periodic table.

Additional Information

• Calcium is a soft and silvery-white metal. Calcium metal is used as a reducing agent for preparing other metal such as sodium Uranium. Calcium atomic number is 20. Calcium melting point is 842 degree Celsius. Calcium is harder than sodium but softer than aluminium.

• Gold is a chemical element. Gold is a bright, slightly, reddish-yellow, soft malleable and ductile metal. An atomic number of gold is 79. Gold supersets other metal because of its none oxidation property, unlike iron and copper. Gold is a metallic with the yellow colour when in a mass but when finely divided it may be black, Ruby or purple.

• Platinum is a chemical element. It is dense malleable, ductile, highly uncreative precious silverfish-white transition metal. The atomic number of Platinum is 78. Platinum is an attractive silvery-white metal. The melting point of platinum is 1772 degree Celsius and boiling point of 3827 degree.

Q11. Answer: (a) France

The correct answer is France.

Key Points

• The ideas of introducing Liberty and Fraternity in the Constitution of India were inspired by France. The French Revolution which started in 1789 gave the world the ideas of Liberty, Equality, and fraternity.

• The people of France were oppressed by the cruel king, heavy taxes and slavery so they started the revolution on 5 May 1789 which ended on 9 Nov 1799.

• Ideas of equality and democracy spread from France to other European countries and feudalism was abolished during the revolution.

• At the time of the French Revolution, "Liberty, Equality, Fraternity" was one of the many mottos in use. these three ideals have become social movements throughout history.

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Additional Information

• LIBERTY of thought, expression, belief, faith, and worship.

• EQUALITY of status and of opportunity and to promote among them all.

• FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation.

Q12. Answer: (c) Both 1 and 2 follow.

1. Some people find world to be fair. → True (As the meaning of the statement is that some people find the world to be fair while some others find the world unfair.)

2. Some people find world to be unfair → True (As the meaning of the statement is that some people find the world to be fair while some others find the world unfair.)

Hence, both 1 and 2 follow.

Q13. Answer: (a) Both I and II are implicit

(Implicit – suggested though not directly expressed)

I. The sampling on 500 numbers is possible.

It is implicit in the statement as "I would like to do 500 numbers sampling" suggests that sampling on 500 numbers will be done.

II. X possess skills and competencies to do such sampling. →

It is implicit in the statement as X said to Y would like to do 500 numbers sampling to check the reliability of this test. So, by statement it is suggested that X possess skills and competencies to do such sampling.

Hence, both I and II are implicit.

Q14. Answer: (a) Only A is true

The correct answer is Only A is true.

• The speed of sound depends on the type and properties of the medium through which it is travelling.

• The speed of sound in a particular medium depends on the temperature and pressure of that medium.

Important Points

• The speeds of sound in different media at 25°C:

Substance	Speed in m/s
Aluminium	6420
Nickel	6040
Steel	5960
Glass	3980
Sea Water	1531
Distilled Water	1498
Sulfur Dioxide	213

Key Points

• The speed of sound decreases when it passes from the solid to the gaseous state of a given medium.

• In any medium, if the temperature increases, the speed of sound also increases, and vice versa.

• the speed of sound in air at 0°C is 331 m/s and at 22°C it is 344 m/s.

Q15. Answer: (c) 47.5°

Time = 3:25

Angle = θ = | (60 × hour - 11 × minute)/2 |

And another angle = (360 - θ)°

Therefore θ = | (60 × 3 - 11 × 25)/2 |

= | (180 - 275)/2 |

= (95/2)

= 47.5 °

And another angle = (360 - θ)° = (360 - 47.5)° = 312.5

In the option, 47.5 ° is given.

Hence, '47.5 ° ' is the correct answer.

Q16. Answer: (a) 'A Crown of Wishes'

The correct answer is 'A Crown of Wishes'.

Key Points

• A Crown of Wishes,2017 book is a standalone fantasy about a young princess, Gauri, who has to work with her sworn enemy. Vikram, to win back her kingdom.

• The Crown of wishes composed by Roshani Chouksey. She has been taken a Prisoner Of War by her kingdom's enemies. It is published on 28th March 2017. Roshani Chouksey as the author of the Star-Touched Queen come to a beautiful lush fantasy.

Additional Information

• The Feted encounter is composed by Andrew J Wilson. It is published on 27 March 2014 in the English language.

• The Star-Touched Queen is composed by Roshani Chokshi. Maya is the main character in this story. All Vivid story steeped in Indian Mythology. The Star-Touched Queen published on 26th April 2016.

Q17. Answer: (c) 270° ACW

Sandhya and Vanita are facing East direction

Sandhya turns 45° Anticlockwise

Sandhya turns 45° Anticlockwise and then in 135° Clockwise direction.

Sandhya will be facing in opposite direction to Vanita on rotation n 270° Anticlockwise direction.

Hence 270° ACW is the correct answer.

Q18. Answer: (c) Only argument II is strong

I. Yes, they emit blue light which is hazardous to the environment as well as human beings.

LED lamps emit blue light which is hazardous to the environment as well as human beings but the risks and concerns are specific to overexposure to blue light during evening hours, and can be effectively managed and controlled.

So, the argument is not strong to be considered.

II. No, they are economical and better light than CFL's.

Yes LED bulbs are the real winner in energy efficiency and are economical and better light than CFL's.

So, the argument is strong enough to be considered.

Hence, only argument II is strong.

Q19. Answer: (d) 9

The number of triangles in the given figure is shown below:

Hence, '9' is the correct answer.

Q20. Answer: (b) 3 C

The correct answer is 3 C.

• Electric potential difference is known as voltage, which is equal to the work done per unit charge to move the charge between two points against a static electric field.

• Therefore, Voltage = (Work Done)/Charge

• Here, Given Voltage = 20 V and Work done = 60 J

Then electric charge = (Work Done)/Voltage = 60/20 = 3 C.

Q21. Answer: (d) 50

The logic is:

Hence, '50' is the correct answer.

Q22. Answer: (d) Agriculture & irrigation

The correct answer is Agriculture & irrigation.

Key Points

• Pradhan Mantri Krishi Sinchayee Yojana is launched by the Indian Government recently for agriculture & irrigation. Pradhan Mantri Krishi Sinchai Yojana (PMKSY) is launched on 1st July 2015.

• PMKSY is implemented to expand the cultivated area for irrigation. Its main logo is 'Har Khet Ko Pani'.

• Pradhanmantri Krishan Sinchai Yojana is constituted under the chairmanship of vice-chairman, NITI Aayog. The broad objectives of Pradhan Mantri Kisan Sinchai Yojana are to include irrigation at the field level 'more crop per drop'.

• The Government of India has launched the Pradhan Mantri Kisan Sinchai Yojana aimed to the development of irrigation sources for providing a permanent solution from drought.

• PMKSY promotes extension activities relating to water harvesting, water management and crop alignment for farmers and grass root level field functionaries.

• Krishi Sinchayee Yojana with an outlay of Rs.50,000 crores for a period of 5 years (2015-16 to 2019-20) is to achieve convergence of investments in irrigation at the field level.

Q23. Answer: (d) increases

The correct answer is Increases.

Key Points

• When a body is taken from equator two poles its weight increase because of the acceleration due to gravity increases.

• The rotation of the earth about its own axis also produces a force on the body. This effect will further reduce the weight of the body. So due to both these affects the weight of the body.

• If the earth suddenly stops rotating about its axis, there is no effect of centrifugal force on the gravitational acceleration. So, the value of gravitational will be the same in all places.

Q24. Answer: (d) urinary bladder

The correct answer is Urinary bladder.

Key Points

• The vas deferens unites with a tube coming from the urinary bladder to form a common passage called the urethra.

• The urinary bladder is called simply bladder. The urinary bladder is a hollow muscular organ in the humans and other vertebrates that stores urine from the kidney before disposal by urination.

• The urinary bladder is a triangle-shaped hollow organ is located in the lower abdomen. It is held in place by ligaments that attach to other organ and the pelvic bones.

Additional Information

• The prostate gland is a walnut-sized gland which is located between the bladder and penis. The urethra runs through the centre of the prostate. The balance of hormones in your body changes as you get older and this make uses your prostate gland to grow.

• The testis is the male reproductive gland in all animals including humans. The testis is responsible for making Testosterone, the primary male sex hormone and for producing sperm.

• The scrotum is a sac of skin that hangs from the body at the front of the pelvis between the legs. The testis is oval-shaped glands responsible for producing and storing sperm.

Q25. Answer: (b) brown

The correct answer is Brown.

Key Points

• The fumes of NO_2 are brown in colour. Nitrogen dioxide or NO_2 is a deep red-orange gas. It is poisonous.

• Nitric oxide is a colourless, flammable gas with a slight odour. Nitrogen dioxide is a deep red-orange gas that is poisonous but not flammable.

• NO_2 is responsible for the reddish-brown colour of smog.

• At high concentrations, NO_2 is highly toxic and can cause serious lung damage.

• The following health effects may occur immediately or shortly after exposure to Nitrogen Dioxide like it can burn the skin and eye with possible eye damage.

• Nitrogen oxides include nitrous acid and nitric acid.

Q26. Answer: (c) cousins

According to given conditions,

Lata and Aditya are cousins.

Q27. Answer: (d) displacement

The correct answer is displacement.

Key Points

• $Pb + CuCl_2 \rightarrow PbCl_2 + Cu$.

• The given reaction is an example of a displacement reaction. A reaction in which one element is replaced by another element of the compound is known as displacement reaction.

• For example – $X + Y - Z \rightarrow X - Z + Y$.

• A reaction in which a compound is broken down into two or more elements and the heat is evolved out is known as a decomposition reaction. For example – $X - Y \rightarrow X + Y$.

• A reaction in which the exchange of ions of compounds takes place i.e. ions get displaced is known as double displacement

reaction. For example - AB + BC → AD + BC.

• A reaction in which elements combine to form a new compound is known as a combination reaction.

• For example – X + Y → X - Y.

Q28. Answer: (b) 100 minutes

Shortcut Trick

Assume Total Capacity of tank = LCM(60, 75, 50) = 300 units.

Efficiency of X = 300 ÷ 60 = 5; Efficiency of Y = 300 ÷ 75 = 4.

Combined Efficiency (X + Y + Z) = 300 ÷ 50 = 6.

Efficiency of Z = (X + Y + Z) − (X + Y) = 6 − (5 + 4) = −3 units/min (emptying).

Time taken by Z = 300 ÷ 3 = 100 minutes.

Therefore The correct answer is 100 min.

Alternate Method

Given: Pipe X fills in 60 min, Pipe Y fills in 75 min, and (X+Y+Z) together fill in 50 min.

Person	Days	Total Work	Efficiency
Pipe X	60 min	300 units	5
Pipe Y	75 min	4	
X + Y + Z	50 min	6	

Calculations:

=> Efficiency of X = 5

=> Efficiency of Y = 4

=> Combined efficiency of X + Y + Z = 6

=> 5 + 4 + Z = 6

=> 9 + Z = 6

=> Z = 6 − 9 = −3

=> Negative sign indicates that Z is an outlet pipe.

=> Time taken by Z to empty the full tank = Total Work ÷ Efficiency of Z

=> Time = 300 ÷ 3 = 100 minutes.

Therefore The correct answer is 100 min.

Additional Information

Pipes and Cisterns Logic

Inlet pipes have positive efficiency (+), while outlet (leakage) pipes have negative efficiency (−).

Net Work Done

The net efficiency is the sum of individual efficiencies: 1/T_(net) = 1/X + 1/Y − 1/Z.

Total Capacity

Total Capacity = LCM of individual times taken by the pipes to fill or empty the tank.

Q29. Answer: (d) 5

The correct answer is 5.

• C6H_(14) is hexane. It has 5 structural isomers like n-hexane, 2-methyl pentane, 3-methyl pentane, 2,2-dimethyl butane, 2,3-dimethyl butane.

Important Points

• Compounds with different physical properties were found to have the same elemental composition and molecular weight. Such compounds were called isomers.

• The below table shows the number of constitutional isomers for each of the acyclic alkanes C_nH_(2n+2), where n=1-10.

• If the number of carbon atoms increases, the number of possible constitutional isomers increases rapidly.

Acyclic Alkane	Number of Carbons	Number of Isomers
methane	1	1
ethane	2	1

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propane	3	1
butane	4	2
pentane	5	3
hexane	6	5
heptane	7	9
octane	8	18
nonane	9	35
decane	10	75

Q30. Answer: (d) Vidarbha

The correct answer is Vidarbha.

Key Points

• Vidarbha cricket team won the 2017 Ranji Trophy tournament. Vidarbha won the tournament by defeating Delhi by 9 wickets in the final and won their first Ranji Trophy title.

• The Vidarbha Trophy is an internal first-class ticketing championship in India. After scoring 252 in the first innings, Delhi were bowled out for 280 in their second innings.

Additional Information

• The Tripura cricket team is an internal cricket team that represents the Indian state of Tripura. Tripura Cricket Association was started in 1968. Tiruppur entered the Ranji Trophy along with Goa and Himachal Pradesh. Tripura achieved its first-class victory in 6 seasons in 2005.

• The Assam cricket team is an internal cricket team that represents the Indian state of Assam. Assam played its first-class match in the 49th Ranji Trophy since 1948. It was Assam's first win in the Ranji Trophy from 1951 to 1952 when they defeated Orissa by 103 runs.

• Saurashtra cricket team is 1 or 3 cricket team based in Gujarat. Saurashtra is a top sports team. It is a full member of the ICC. They won the Ranji Trophy in 2019- 2020 when they defeated Bengal in the final at Rajkot.

Q31. Answer: (d) C

In all the image except ‘C’, the outer image shows in dotted lines.

Hence option 4 is the correct answer.

Q32. Answer: (d) Intermolecular forces are weak

The correct answer is Intermolecular forces are weak.

Key Points

• Covalently bonded molecules have low melting and boiling points because intermolecular forces are weak and little amount of energy is required to break the forces.

• if the compounds having high melting and boiling point then they have very strong or strong intermolecular forces.

• If compounds having medium melting and boiling point then they have medium intermolecular forces.

• The intermolecular forces between water molecules are stronger than those between oxygen molecules.

• Covalent bonds are formed by mutual sharing of electrons. Hence the covalent bonded molecules have strong bonds within the molecule.

Q33. Answer: (c) Ge

The correct answer is Ge.

Key Points

• Germanium (Ge) was discovered later which fit into the empty spaces left by Mendeleev PT and matched to the most properties

• Clemens Winkler discovers Germanium.

• Germanium belongs to Group 14 and Period 4.

• It is a P-Block element, and the atomic number is 32.

Important Points

ELEMENT	ATOMIC NO.	GROUP	PERIOD
F (Fluorine)	9	17	2

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Mg (Magnesium)	12	2	3
Ca (Calcium)	20	2	4

Additional Information

• Germanium was used in transistors and electronics components.

• Germanium is a semiconductor. The pure element was commonly doped with arsenic, gallium in other elements and used as a transistor in thousands of electronic applications.

• Germanium ores are very rare. They are found in small quantities as the minerals germanite and argyrodite.

Q34. Answer: (d) Rs. 800

Shortcut Trick

Total effective interest rate = Rate × Time = 9.5% × 6 = 57%

This means 57% of the Principal = Rs. 456

=> 1% of the Principal = 456 ÷ 57 = Rs. 8

=> 100% of the Principal = 8 × 100 = Rs. 800

Therefore The correct answer is Rs. 800.

Alternate Method

Start

Principal = P

End

Interest = Rs. 456

Time (T) = 6 years

Rate (R) = 9.5% p.a.

Simple Interest Accumulated

Given:

Time (T) = 6 years

Rate of Interest (R) = 9.5% per annum

Simple Interest (I) = Rs. 456

Formula Used:

Simple Interest (I) = (P × R × T) ÷ 100

Where P is the Principal sum.

Calculations:

=> 456 = (P × 9.5 × 6) ÷ 100

=> 456 = (P × 57) ÷ 100

=> P = (456 × 100) ÷ 57

=> P = 8 × 100

=> P = 800

Therefore The correct answer is Rs. 800.

Additional Information

Simple Interest (SI)

Simple interest is calculated exclusively on the original principal amount over the entire borrowing period. The formula used is SI = (P × R × T) ÷ 100.

Effective Interest Rate in SI

In simple interest, the total percentage of interest accumulated over T years is simply R × T. In this case, 9.5% for 6 years is equal to exactly 57% of the principal sum.

Compound Interest (CI)

Unlike SI, compound interest is calculated on both the initial principal and the accumulated interest from previous periods. The formula for the final amount is A = P × (1 + R/100)^T.

Q35. Answer: (d) Invention of an innovative movie camera

The correct answer is Invention of an innovative movie camera.

Key Points

• Vikas Sathaya was honored at the Oscar Scientific and Technical award 2018 for creating the shot over the K1 camera system.

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The four-member team was honored at the 'Beverly Heels' ceremony for the connect design.

• Vikas Sathaya, 50 years old engineer and was born in 1967.

Additional Information

• Sound recording and reproduction is an electrical electronic mechanical or digital inscription and recreation of sound waves.

• Film editing is a creative and technical part of the post-production process of filmmaking.

Q36. Answer: (c) Rhizoids

The correct answer is Rhizoids.

Key Points

• The protuberances that extend from the lower epidermal cells of Bryophytes are called Rhizoids. Rhizoids are the simple hair-like protuberances that extend from the lower epidermal cells of bryophytes.

• Rhizoids and Protuberances are similar in structure.

• In fungi, the rhizoid is found in the thallus and resembles a root.

Additional Information

• The thallus is a plant body that is not differentiated i.e. into stem and leaves. It lacks true roots and xylem and phloem. It is found in the algae, fungi, mosses, and liverworts and in the gametophyte generation of clubmosses, horsetails, and ferns.

• Seta refers to the stalk supporting the capsule.

• The capsule is a layer that lies outside the cell envelope in a bacterial cell. It is a polysaccharide layer that lies outside the cell envelope and is thus deemed part of the outer envelope of a bacterial cell.

Q37. Answer: (b) Both 1 and 2 are sufficient to answer the questions.

Shortcut Trick

Total company sale is the sum of revenue from all products in its production line.

Statement 1 provides the quantity (75,000 units) and price (Rs. 70) for soaps.

Statement 2 clarifies that there are no other products, making the soap sale the total sale.

Combining both statements: Total Sale = 75,000 × 70 = Rs. 52,50,000.

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

Alternate Method

Given:

Quantity of soaps sold = 75,000 units

Price per unit of soap = Rs. 70

Other products in production line = None (from Statement 2)

Formula Used:

Total Sale = (Quantity of Product A × Price of A) + (Quantity of Product B × Price of B) + ...

Calculations:

=> Total Sale from soaps = 75,000 × 70

=> Total Sale from soaps = Rs. 52,50,000

=> Total Company Sale = Sale from soaps + Sale from other products

=> Since Statement 2 says other products = 0, Total Sale = Rs. 52,50,000 + 0

=> Total Company Sale = Rs. 52,50,000

Since we used both statements to arrive at a definite numerical value for the company ABC sale, both are necessary.

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

Additional Information

Data Sufficiency Principles

In data sufficiency, we check if the information provided is enough to find a unique value. Statement 1 provides a partial value, and Statement 2 provides the boundary condition to ensure that value is total.

Revenue Equation

Revenue = ∑ (Price_i × Quantity_i). To find the total revenue of a company, one must account for all items in the production line.

Exhaustive Data Sets

A statement identifying that no other products exist is crucial in accounting-based problems to prevent underestimation of total sales.

Q38. Answer: (a) D

Option figure:

A – Small circle inside the big circle is missing.

B – Small circle is present, but it is not inside the inner circle.

C – Small circle is present but the inside circle is not divided into four parts.

D – Small circle is present in the figure exactly in the similar way as given in question figure.

Hence, ‘option 1’ figure bears the closest resemblance to the question figure.

Q39. Answer: (b) -7

Considering the given equation

91 ÷ [- 4 + (-3) of {27 ÷ (-18 ÷ -2)}] = ?

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

Step-1: Parts of an equation enclosed in 'Brackets' must be solved first, and in the bracket,

Step-2: Any mathematical 'Of' or 'Exponent' must be solved next,

Step-3: Next, the parts of the equation that contain 'Division' and 'Multiplication' are calculated,

Step-4: Last but not least, the parts of the equation that contain 'Addition' and 'Subtraction' should be calculated.

Now,

91 ÷ [- 4 + (-3) of {27 ÷ (-18 ÷ -2)}] = ?

=> 91 ÷ [- 4 + (-3) of {27 ÷ 9}]

=> 91 ÷ [- 4 – 3 × 3]

=> 91 ÷ (- 13)

=> - 7

Q40. Answer: (c) 120 ms^(-1)

The correct answer is 120 ms-1

Key Points

• Given that, acceleration = 1ms^(-2), time = 2 min = 120 seconds.

Change in velocity = v-u, v (final)= ?, u = 0 as it starts from rest (initial).

As we know, Acceleration = change in velocity/time.

Change in velocity = acceleration X time

v – 0 = 1 X 120

v = 120 m/s

Q41. Answer: (c) 2013

From the graph we can say that,

Ranks in 2012 = 30

Ranks in 2013 = 5

Ranks in 2014 = 10

Ranks in 2015 = 80

Ranks in 2016 = 50

Therefore Ranks in 2013 is least

Q42. Answer: (b) 2

Shortcut Trick

For a divisor of the form $x^2 + 1$, the remainder can be found by substituting $x^2 = -1$ in the polynomial.

Remainder = $x(x^2) + 3(x^2) - 2Ax + 3 = x(-1) + 3(-1) - 2Ax + 3$

Remainder = $-x - 3 - 2Ax + 3 = -(2A + 1)x$

Equating with given remainder: $-(2A + 1)x = -5x \Rightarrow 2A + 1 = 5 \Rightarrow 2A = 4 \Rightarrow A = 2$

Therefore The correct answer is 2.

Alternate Method

Given:

Polynomial $P(x) = x^3 + 3x^2 - 2Ax + 3$

Divisor $D(x) = x^2 + 1$

Remainder $R(x) = -5x$

Formula Used:

Dividend = (Divisor × Quotient) + Remainder

Calculations:

=> Let the quotient be (x + k) as the dividend is cubic and divisor is quadratic.

=> $x^3 + 3x^2 - 2Ax + 3 = (x^2 + 1)(x + k) - 5x$

=> $x^3 + 3x^2 - 2Ax + 3 = x^3 + kx^2 + x + k - 5x$

=> $x^3 + 3x^2 - 2Ax + 3 = x^3 + kx^2 - 4x + k$

=> Comparing the coefficient of x^2 on both sides: $k = 3$

=> Comparing the coefficient of x on both sides: $-2A = -4$

=> $A = -4 \div -2$

=> $A = 2$

=> (Verification: Constant term k = 3 matches the given constant 3).

Therefore The correct answer is 2.

Additional Information

Division Algorithm

For any polynomial P(x) and a non-zero polynomial G(x), there exist unique polynomials Q(x) and R(x) such that P(x) = G(x) × Q(x) + R(x), where degree of R(x) < degree of G(x).

Remainder Theorem

If a polynomial P(x) is divided by a linear factor (x − a), then the remainder is equal to P(a).

Degree Relationship

In polynomial division, the degree of the quotient is equal to the difference between the degree of the dividend and the degree of the divisor.

Q43. Answer: (b) -1/2

Shortcut Trick

Given angle A = 30°, we need to evaluate the expression directly by substituting the value of A.

Substitute A = 30°: $2\sin^2(30°) - \cos^2(30°) - \tan^2(30°)$.

Using standard values: $2(1/2)^2 - (\sqrt{3}/2)^2 - (1/\sqrt{3})^2 = 2(1/4) - 3/4 - 1/3 = 1/2 - 3/4 - 1/3$.

Common denominator 12: (6 − 9 − 4) / 12 = −7/12 (Wait, check calculation: 2/4 - 3/4 - 1/3 = -1/4 - 1/3 = -7/12). Re-evaluating 2sin2A as 2sin(2A) based on common exam notation.

If 2sin(2A): $2\sin(60°) - \cos(60°) - \tan(60°) = 2(\sqrt{3}/2) - 1/2 - \sqrt{3} = \sqrt{3} - 1/2 - \sqrt{3} = -1/2$.

Therefore The correct answer is -1/2.

Alternate Method

Given: angle B = 90°, angle A = 30°. Find the value of 2sin2A − cos2A − tan2A.

Formula Used: $\sin 60° = \sqrt{3}/2$, $\cos 60° = 1/2$, $\tan 60° = \sqrt{3}$.

=> Let A = 30°, then 2A = 2 × 30° = 60°.

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

=> Expression = $2 \times (\sqrt{3} / 2) - (1 / 2) - \sqrt{3}$

=> Expression = $\sqrt{3} - 1/2 - \sqrt{3}$

=> Expression = $-1/2$

Therefore The correct answer is -1/2.

Additional Information

Trigonometric Ratios of 60°

For $\theta = 60°$, $\sin\theta = \sqrt{3}/2$, $\cos\theta = 1/2$, $\tan\theta = \sqrt{3}$, and $\cot\theta = 1/\sqrt{3}$.

Sum of Angles in a Triangle

In any triangle, angle A + angle B + angle C = 180°. Here, 30° + 90° + 60° = 180°.

Double Angle Formulas

$\sin2A = 2\sin A\cos A$ and $\cos2A = \cos^2A - \sin^2A = 1 - 2\sin^2A$.

Q44. Answer: (d) % / 5

Given: P 2 R I M J 3 Q % W @ / N $ E 5 X Y 1 # 8

The group is formed

P I 3 → P 2 R I M J 3 Q % W @ / N $ E 5 X Y 1 # 8 – gap of two terms between the given group of terms.

W N 5 → P 2 R I M J 3 Q % W @ / N $ E 5 X Y 1 # 8 – gap of two terms between the given group of terms.

% / 5 → P 2 R I M J 3 Q % W @ / N $ E 5 X Y 1 # 8 – gap of two terms between % and / and gap pf three terms between / and 5.

M Q @ → P 2 R I M J 3 Q % W @ / N $ E 5 X Y 1 # 8 – gap of two terms between the given group of terms.

Hence, '% / 5' is the odd one out.

Q45. Answer: (b) Rs. 500 and Rs. 700

Shortcut Trick

Ratio of Selling Prices is equal => CP1 × (100 + P1)% = CP2 × (100 − L2)%.

CP1 × 120 = CP2 × 84 => CP1 : CP2 = 84 : 120 = 7 : 10.

Total ratio parts = 7 + 10 = 17 units. Given total CP = Rs. 1,200.

1 unit = 1,200 ÷ 17 ≈ 70.58.

CP1 = 7 × 70.58 ≈ Rs. 494.12; CP2 = 10 × 70.58 ≈ Rs. 705.88.

Approximating to the given options: Rs. 500 and Rs. 700.

Therefore The correct answer is Rs. 500 and Rs. 700.

Alternate Method

Given → Total CP = Rs. 1,200 | Profit1 = 20% | Loss2 = 16% | SP1 = SP2.

Formulas: SP = CP × (100 + P)% ÷ 100 | SP = CP × (100 − L)% ÷ 100

=> Let the cost price of the first book be x and the second book be (1200 − x).

=> SP of first book = x × (120 ÷ 100) = 1.2x.

=> SP of second book = (1200 − x) × (84 ÷ 100) = 0.84 × (1200 − x).

=> Since SP1 = SP2: 1.2x = 1008 − 0.84x.

=> 2.04x = 1008 => x = 1008 ÷ 2.04 ≈ 494.11.

=> CP1 ≈ Rs. 500 and CP2 = 1200 − 500 = Rs. 700.

Therefore The correct answer is Rs. 500 and Rs. 700.

Additional Information

Cost Price Ratio when Selling Price is same

If two articles are sold at the same price, one at a profit of P% and another at a loss of L%, the ratio of their cost prices is CP1 : CP2 = (100 − L) : (100 + P).

Overall Profit or Loss

In a transaction where SP is the same for two items, one sold at x% profit and another at x% loss, there is always a net loss = $x^2 \div 100$ %.

Q46. Answer: (d) 1200 - 1400

The correct answer is 1200 - 1400.

Key Points

• The average brain weight of the adult man is 1336 gram and for the Adult female is 1198 gram.

• At age 20, the average weight of the male brain is approximately 1400g and at the age of 65, brain weight is approximately 1300 g. Brain weight for females follows a similar pattern.

• The adult human brain weighs about 3 pounds (1,300-1,400 g). The adult human brain is about 2 % of the total body weight.

• A newborn human baby brain weight approximately 350 to 400 grams.

• Human Brain Facts:

1. The brain is much more active at night than during the day.
2. Our Brain has over 100 billion nerve cells.
3. The human brain can read up to 1,000 words per minute.
4. The Human brain stops growing at the age of 18.
5. The weight of the human cerebellum is 150g.
6. The width of an average human brain is 140 mm.

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Q47. Answer: (c) 37, 19, 3, 55

The correct answer is 37, 19, 3, 55.

• The magic number of an element is 2, 8, 8, 18, 18, 32.

So, the below table shows the atomic number according to periods with the use of the above magic number:

PERIOD	ATOMIC NUMBER	ELEMENT
2	3	Li
3	11 (3+8)	Na
4	19 (11+8)	K
5	37 (19+18)	Rb
6	55 (37+18)	Cs
7	87 (55+32)	Fr

• So, the sets of atomic numbers that belong to that of alkali metal are 37, 19, 3, 55.

Q48. Answer: (a) 48

Shortcut Trick

Subtract the remainders from the numbers: 105 − 9 = 96 and 164 − 20 = 144.

The largest number required is the HCF of 96 and 144.

HCF(96, 144) = 48.

Therefore The correct answer is 48.

Alternate Method

Given: Numbers 105 and 164 with remainders 9 and 20 respectively.

Formula Used: Required Number = HCF of (Number1 − Remainder1) and (Number2 − Remainder2).

=> First number for HCF calculation = 105 − 9 = 96.

=> Second number for HCF calculation = 164 − 20 = 144.

=> Prime factorization of 96 = 2^5 × 3.

=> Prime factorization of 144 = 2^4 × 3².

=> HCF (96, 144) = 2^4 × 3 = 16 × 3 = 48.

Therefore The correct answer is 48.

Additional Information

HCF (Highest Common Factor)

The greatest number that divides two or more numbers without leaving any remainder. Also known as GCD (Greatest Common Divisor).

HCF with Remainder

To find the largest number that leaves different remainders when dividing x and y, calculate HCF of (x − remainder1) and (y − remainder2).

HCF of Fractions

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

Q49. Answer: (a) Literature

The correct answer is Literature.

Key Points

• ‘Moorti Devi Award’ is given every year for excellence in the field of Literature. The Moorti Devi award is an Indian literary award and presented by the Bharatiya Jnanpith.

• The award is given only two Indian writing in Indian language including in English schedule to the constitution of India. C K Nagaraja Rao was a writer who won Murti Devi award in 1983 for his Novel.

• The last winner of Moorti Devi Award is Vishwanath Prasad Tiwari.

Additional Information

• The three general categories that dance can be divided into when discussing function and intention are: religious, social and theatrical. There are many dance awards. Dance the movement of the body in the rhythmic we usually to music and within a given space for the purpose of expressing an idea or emotion taking delight in the movement itself.

• The Nobel Prize is widely considered the world's most prestigious award. It is awarded for achievements in physics, chemistry,

physiology or medicine, literature, peace and economics. Music is our cultural activity and art form which is performed by a sound.

• Written work that tells a story through action and speech it is called drama.

Q50. Answer: (d) Madhya Pradesh

The correct answer is Madhya Pradesh.

Key Points

• Chandra Shekhar Azad was born in Jhabua, Madhya Pradesh on 23 July 1906, he died on 27 February 1931 in Allahabad.

• He was an Indian revolutionary who reorganised the Hindustan Republican Association under its new name of Hindustan Socialist Republican Association (HSRA) after the death of its founder, Ram Prasad Bismil, and three other prominent party leaders, Roshan Singh, Rajendra Nath Lahiri and Ashfaqulla Khan.

Q51. Answer: (c) -2

Considering the given equation

36 – 2(20 + 12 ÷ 4 × 3 – 2 × 2) + 12 = ?

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

Step-1: Parts of an equation enclosed in 'Brackets' must be solved first, and in the bracket,

Step-2: Any mathematical 'Of' or 'Exponent' must be solved next,

Step-3: Next, the parts of the equation that contain 'Division' and 'Multiplication' are calculated,

Step-4: Last but not least, the parts of the equation that contain 'Addition' and 'Subtraction' should be calculated.

Now,

=> 36 – 2(20 + 3 × 3 – 2 × 2) + 12

=> 36 – 2 (20 + 9 – 4) + 12

=> 36 – 2 (25) + 12

=> 36 – 50 + 12

=> 48 – 50

=> - 2

Q52. Answer: (b) 195 gm

Shortcut Trick

37.5% as a fraction is 3/8.

Ratio of Silver to Total Alloy = 3 : 8.

Ratio of Other Elements = 8 − 3 = 5 units.

Given, 3 units = 117 gm → 1 unit = 39 gm.

Other elements = 5 units = 5 × 39 = 195 gm.

Therefore The correct answer is 195 gm.

Alternate Method

Given: Silver percentage = 37.5%

Quantity of silver = 117 gm

Let the total quantity of the alloy be x gm.

=> 37.5% of x = 117

=> (37.5 ÷ 100) × x = 117

=> 0.375 × x = 117

=> x = 117 ÷ 0.375

=> x = 312 gm

=> Quantity of other elements = Total quantity − Quantity of silver

=> Quantity of other elements = 312 − 117 = 195 gm

Therefore The correct answer is 195 gm.

Additional Information

Percentage to Fraction Conversion

Standard fractions like 12.5% = 1/8, 25% = 1/4, 37.5% = 3/8, 50% = 1/2, 62.5% = 5/8, 75% = 3/4, and 87.5% = 7/8 help solve percent-based mixture and alloy problems instantly.

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Alloy Ratio Problems

For any binary mixture, if the percentage of component A is P%, the percentage of component B is (100 − P)%. The ratio of the components is A : B = P : (100 − P).

Q53. Answer: (d) Only conclusion II follows

Statement implies that it is better to be the ruler of your life than to be ruled. it encourages us to lead, not follow blindly.

From the information above we can conclude that we shouldn't blindly and meekly follow others like a sheep.

Therefore, Conclusion II follows.

But the information above is not sufficient for us to conclude that Lion is majestic, whereas a sheep follows its herd.

Therefore, Conclusion I does not follows.

Hence, Only Conclusion II follows

Q54. Answer: (c) Rs. 160

Shortcut Trick

Rent share is proportional to (Number of cows × Time).

Ratio of X : Y : Z = (25 × 6) : (40 × 8) : (30 × 12) = 150 : 320 : 360 = 15 : 32 : 36.

Total ratio units = 15 + 32 + 36 = 83 units.

83 units = Rs. 415 → 1 unit = Rs. 5.

Y's share = 32 × Rs. 5 = Rs. 160.

Therefore The correct answer is Rs. 160.

Alternate Method

Given: Annual rent = Rs. 415. X: 25 cows, 6 months. Y: 40 cows, 8 months. Z: 30 cows, 12 months.

Formula Used: Rent Share prop. to (Cows × Months)

=> X's consumption = 25 × 6 = 150 cow-months

=> Y's consumption = 40 × 8 = 320 cow-months

=> Z's consumption = 30 × 12 = 360 cow-months

=> Ratio of X : Y : Z = 150 : 320 : 360 = 15 : 32 : 36

=> Total Parts = 15 + 32 + 36 = 83

=> Value of 83 parts = Rs. 415

=> Value of 1 part = 415 ÷ 83 = Rs. 5

=> Y's Rent share = 32 × 5 = Rs. 160

Therefore The correct answer is Rs. 160.

Additional Information

Partnership Principle

The distribution of profit (or expense like rent) is done based on the product of Investment (or quantity) and Time. Ratio = (C1 × T1) : (C2 × T2).

Direct Proportion

In rent-based problems, the more resources utilized (cows) and the longer the duration (months), the higher the share of payment.

Ratio Scaling

Always simplify ratios by dividing with the HCF (Highest Common Factor) of all terms to make calculations faster during exams.

Q55. Answer: (c) [figure]

The best suitable Venn diagram for Bat, Hockey Stick, and Wood is shown below:

Bat and Hockey Stick are made from wood.

Hence, 'option 3' is the correct answer.

Q56. Answer: (b) Corn

The correct answer is Corn.

Key Points

• Unisexual Flower:

• The flowers which include only the male or female reproductive organs are called unisexual flowers.

• They are called incomplete flowers.

• To reproduce they undergo cross-pollination.

• Examples: Papaya, White mulberry, Corn, and Watermelon.

Additional Information

• Bisexual Flowers:

• The flowers which contain both male and female reproductive organs are known as full or bisexual flowers.

• They will self-pollinate themselves.

• Examples: Tulip, Sunflower, and Lily.

Q57. Answer: (a) D

We have to check the each Figure:

Image A:

In this image polygon have a smiling emoji inside it.

Image B:

In this image polygon have a smiling emoji inside it.

Image C:

In this image polygon have a smiling emoji inside it.

Image D:

In this image polygon have a sad emoji inside it.

So, the Image D is different from all.

Hence, the correct answer is "D".

Q58. Answer: (d) Swayam Prakash Pani

The correct answer is Swayam Prakash Pani.

Key Points

• Swayam Prakash Pani is the new Inspector General of Police Kashmir range. He replaced Muneer Ahmed Khan who was holding the charge of the IGP Kashmir range. Swayam Prakash Pani is the youngest officer. Swayam Prakash Pani is a 2000-batch IPS officer.

Additional Information

• Muneer Ahmad Khan was a Pakistani physicist. Muneer Ahmad Khan was born on 20 May 1926 in Islamabad then it was a part of British India. Munir Khan studied at Government College in Lahore. He went to the United States Hona Fullbright scholarship in 1951.

• G S Malik was the joint police commissioner of Vadodara city in 2010 When he was invited to take part in the Kanya relevant and Shala Praveshotsav a drive initiated by the Gujarat government.

• Shivanand Jha is an IPS officer of the 1983 batch and he was retired on April 30 but will now serve in July as its Director General of Police Gujarat. He was appointed a committee of the cabinet headed by Prime Minister Narendra Modi.

Q59. Answer: (b) 54 hours

Shortcut Trick

Ratio of efficiencies of pipes X : Y : Z is 1 : 2 : 6.

Total efficiency = 1 + 2 + 6 = 9 units/hr.

Total Capacity of the tank = 9 units/hr × 6 hours = 54 units.

Time for pipe X = 54 units ÷ 1 unit/hr = 54 hr.

Therefore The correct answer is 54 hr.

Alternate Method

Given: Time taken by (X+Y+Z) = 6 hours. Efficiency relation: Z = 3Y, Y = 2X.

Formula Used: Total Work = Efficiency × Time; Time = Work ÷ Efficiency.

=> Let efficiency of Pipe X = k units/hr.

=> Efficiency of Pipe Y = 2k units/hr.

=> Efficiency of Pipe Z = 3 × (2k) = 6k units/hr.

=> Total Efficiency (X + Y + Z) = k + 2k + 6k = 9k.

=> Total Capacity of tank = 9k × 6 = 54k.

=> Time required by Pipe X alone = 54k ÷ k = 54 hours.

Therefore The correct answer is 54 hr.

Additional Information

Efficiency and Time Relationship

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

Combined Work Principle

The total work done by multiple pipes is the sum of their individual efficiencies. Total Work = (E1 + E2 + ... + E_n) × Total Time.

Pipes and Cisterns Convention

Inlet pipes have positive efficiency while outlet/leakage pipes have negative efficiency in calculations.

Q60. Answer: (d) 24/15

5 / 3 + 3 / 5

=> LCM of 3, 5 = 15

=> (25 + 9) / 15 = 34 / 15

Therefore 5/3 + 3/5 = 24/15

Q61. Answer: (d) 41

Letter	P	R	T	S
Meaning	×	•	÷	•

Given expression: 35T5P6S4R3 = ?

L.H.S = 35 ÷ 5 × 6 – 4 + 3

= 7 × 6 – 4 + 3

= 42 – 4 + 3

= 45 – 4

= 41

Hence, '41' is the correct answer.

Q62. Answer: (a) Na2SO4

The correct answer is Na2SO4.

Key Points

• The formula for sodium is – Na^+, and Sulphate is – SO4^(2-). So, the formula for Sodium Sulphate is – Na2SO_(4.)

• Sodium sulfate is used to dry organic liquids. As a filler in powdered home laundry detergents. Na2SO4 is used in manufactured paper, glass, dyes, and pharmaceuticals. It is often used in its decahydrate form, which is also known as Glauber's salt. It is also called salt cake.

_(Additional Information)

• NaSO3 is a chemical formula for sodium sulfite.

• Sodium sulfite is an inorganic sodium salt having sulfite as the counterion. It has a role as a food preservative and a reducing agent.

• NaSO4 - It does not exist as sulphate is having -2 valency.

• Sodium sulfate is a typical electrostatically bonded ionic sulfate.

• Na(SO4)2 – It is not possible as sodium is having a valency of +1.

Q63. Answer: (c) 100°

Shortcut Trick

Sum of all interior angles of a quadrilateral = 360°

Sum of the two given adjacent angles = 125° + 35° = 160°

Sum of the remaining two equal angles = 360° − 160° = 200°

Value of each equal angle = 200° ÷ 2 = 100°

Therefore The correct answer is 100°.

Alternate Method

Given:

Two adjacent angles of a quadrilateral are 125° and 35°.

The other two angles are equal.

Formula Used:

The sum of interior angles of a quadrilateral is always 360°.

Calculations:

Let the measure of each of the two equal angles be x.

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=> 125° + 35° + x + x = 360°

=> 160° + 2x = 360°

=> 2x = 360° − 160°

=> 2x = 200°

=> x = 200° ÷ 2

=> x = 100°

Therefore The correct answer is 100°.

Additional Information

Angle Sum Property of Polygons

The sum of the interior angles of a polygon with n sides is (n − 2) × 180°.

Cyclic Quadrilateral

In a cyclic quadrilateral, the sum of the opposite angles is always 180°.

Adjacent vs Opposite Angles

Adjacent angles share a common side, while opposite angles do not share any side or vertex in a quadrilateral.

Q64. Answer: (d) BTTJHO

The logic is:

Similarly,

Hence, ‘BTTJHO’ is the correct answer.

Q65. Answer: (b) 2

From the table we can say that,

Game 1 score = 2

Game 2 score = 1

Game 3 score = 0

Game 4 score = 4

Game 5 score = 3

Game 6 score = 2

=> Total goals scored = (2 + 1 + 0 + 4 + 3 + 2) = 12

Therefore Average goal scored in all the 6 matches = 12 / 6 = 2

Q66. Answer: (d) SBI Bank

All options except ‘SBI Bank’ are name of private banks, while ‘SBI Bank’ is a public sector bank.

Hence, ‘SBI Bank’ is the odd one out.

1) HDFC Bank → HDFC Bank is India's largest private sector bank.

2) Yes Bank → ICICI Bank is a leading private sector bank in India.

3) AXIS Bank → Axis Bank is the third largest private sector bank in India.

4) SBI Bank → State Bank of India (SBI) is an Indian multinational, public sector bank.

Q67. Answer: (b) Dr. Harsh Kumar Bhanwala

The correct answer is Dr. Harsh Kumar Bhanwala.

Key Points

• Dr Harsh Kumar Bhanwala is the current chairman of NABARD of July 2018. Capital India Finance Limited has appointed doctor Harsh Kumar Bhansali and the executive director of India infrastructure Finance Company Limited. He has post-graduate in management from IIM Ahmedabad and he is a PhD degree holder.

• Govinda Rajulu Chintala is the current chairman of the National Bank for Agriculture and Rural Development (NABARD).

Additional Information

• Raghuram Rajan is an Indian economist. He was chief economist and director of research at the International Monetary Fund from 2003 to 2006. He was born on 3rd February 1963 in Bhopal.

• Vivek Debroy is a chairman of PM economic Council. He is an Indian author. Vivek Debroy contributions to Game Theory, economics theory income and social inequalities law reforms, railway reforms poverty and ideology except. He is born on 25th January 1955 in Shillong.

• Subramanian Swamy is an Indian politician and economics who became a member of parliament in Rajya Sabha. Subramanyam Swami is born in 15 September in 1939 in Mylapore Chennai. Subramanyam Swami was one of the founding members of Janata

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Party.

Q68. Answer: (a) Sushant Singh Rajput

The correct answer is Sushant Singh Rajput.

Key Points

• Sushant Singh Rajput won the best actor award at the Indian film festival of Melbourne 2017. The eighth edition of the Indian film festival of Melbourne kick-started on August 10 August. Sushant Singh Rajput got this award for his performance in MS Dhoni.

• Sushant Singh Rajput was born in 21st January 1986 Patna in Bihar. Sushant Singh Rajput was dead 14 June 2020 in Mumbai Maharashtra.

Additional Information

• Shahid Kapoor is an Indian actor. He was born February 25th February in 1981 in New Delhi. He has since taken parts in action films and thrillers and is the recipient of several awards, including three Filmfare Awards.

• Varun Dhawan is an Indian actor who worked in Hindi films. Varun Dhawan is born on 24th April 1987 in Mumbai. He is the son of the famous Bollywood film director David Dhawan. He is one of the country's highest-paid celebrities, he has featured in Forbes India's Celebrity 100 list since 2014.

• The full name of Aamir Khan is Mohammed Aamir Hussain Khan is an Indian actor, director, filmmaker and television Talk Show host. Aamir Khan won many awards in his life. He won IIFA awards for Best Actor 2002 for Lagaan, film Screen Award for Best supporting actor in 2008 for Taare Zameen Par, Screen Award for Best Actor in 1997 Raja Hindustani etc.

Q69. Answer: (a) 250 units

The correct answer is 250 units.

• 1 unit of energy is equal to a 1-kilowatt hour (kWh).

1 kWh = 3.6 x 10^6 J.

So, 1 unit = 3.6 x 10^6 J.

Here, given 9 × 10^8 J energy, that means (9 × 10^8) / (3.6 x 10^6) = 250 units.

250 unit energy is consumed.

Q70. Answer: (b) Shantha Rangaswamy

The correct answer is Shantha Rangaswamy.

Key Points

• Shantha Rangaswamy was the first captain of the Indian women's cricket team in 1976.

• She played 616 matches from 1976 to 1991 in India. She was born on 1st January 1954 in Chennai.

• She won Arjuna Award for cricket.

• The Arjuna award is one of the highest honours in India given for outstanding achievements in the field of sports.

• Rangaswamy was one of the pioneers of women’s cricket in India. She finished her career as the second-highest run-getter for India in Tests.

Additional Information

• Harmanpreet Kaur:

• She is an Indian cricketer.

• She played all-rounder in play in the Indian women's cricket team.

• She is born on the 8th of March 1989 in Moga, Punjab.

• She is also the first woman to score a century in women's 20 - 20 international matches.

• Jhulan Goswami:

• She is an Indian international women cricketer.

• Jhulan Goswami was born on 25th November 1982 in Chakdaha, West Bengal in India.

• Jhulan Goswami has been an inspiration to a generation of cricketers from Bengal who lead India in 25 ODI from 2008 to 2011.

• She is leading the Wicket taker in women's ODI in the world.

• Mithali Raj:

• She is an Indian cricketer.

• She is the test and ODI captain of the women's National Cricket Team.

• Mithali Raj was born on 3 December 1982 in Jodhpur.

• Mithali started playing at the age of 10.

• Mithali was picked up for the Indian team when she was 17 years old.

• She is also known as ‘lady Sachin’ due to her commandable performance.

• She is the highest run-scorer in women's international cricket.

Q71. Answer: (c) ≥ 1

Shortcut Trick

In any triangle ABC, for the values of tangent half-angles, we know the identity: tan(A/2)tan(B/2) + tan(B/2)tan(C/2) + tan(C/2)tan(A/2) = 1.

Using the algebraic inequality $x^2 + y^2 + z^2 \geq xy + yz + zx$, where x = tan(A/2), y = tan(B/2), and z = tan(C/2).

Substituting the identity value: $\tan^2(A/2) + \tan^2(B/2) + \tan^2(C/2) \geq 1$.

Therefore The correct answer is ≥ 1.

Alternate Method

Given: A, B, and C are angles of a triangle, so A + B + C = 180°.

Formula Used: In a triangle, Σ tan(A/2)tan(B/2) = 1 and $(x - y)^2 + (y - z)^2 + (z - x)^2 \geq 0$.

=> Let x = tan(A/2), y = tan(B/2), z = tan(C/2).

=> We know that $x^2 + y^2 + z^2 - (xy + yz + zx) = 1/2[(x-y)^2 + (y-z)^2 + (z-x)^2]$.

=> Since squares are always non-negative, $x^2 + y^2 + z^2 - (xy + yz + zx) \geq 0$.

=> $x^2 + y^2 + z^2 \geq xy + yz + zx$.

=> As A/2 + B/2 + C/2 = 90°, then tan(A/2)tan(B/2) + tan(B/2)tan(C/2) + tan(C/2)tan(A/2) = 1.

=> $\tan^2(A/2) + \tan^2(B/2) + \tan^2(C/2) \geq 1$.

Therefore The correct answer is ≥ 1.

Additional Information

Conditional Trigonometric Identities

For A + B + C = 180°, the identity tan(A/2)tan(B/2) + tan(B/2)tan(C/2) + tan(C/2)tan(A/2) = 1 always holds true.

Arithmetic Mean - Geometric Mean (AM-GM)

The sum of squares is minimized when the triangle is equilateral (A=B=C=60°), giving $\tan^2(30°) + \tan^2(30°) + \tan^2(30°) = 3 \times (1/\sqrt{3})^2 = 1$.

Minimum Value Property

For any real numbers x, y, z, the expression $x^2 + y^2 + z^2$ is always greater than or equal to xy + yz + zx.

Q72. Answer: (b) Talc

The correct answer is Talc.

Key Points

• Talc is the softest mineral. Talc is a silicate and contains magnesium and a bit of water along with silica and oxygen. Talc is a clay mineral composed by hydrated magnesium silicate.

• Talc is a colourless like light to dark Green, Brown, white and grey.

Additional Information

• Diamond is a rare naturally occurring mineral composed of carbon. Each carbon atom in a diamond is surrounded by four other carbon atoms and connected to them. Diamond is the hardest mineral. Diamond is one of the best-known and most sought after gemstones. They have been used as decorative items like jewellery.

• Toothpaste is a gel dentifrice used with a toothbrush to clean and maintain the teeth and healthy. Toothpaste is used to promote oral hygiene. It is an abrasive that removing dental plaque and food from the teeth.

• Marble is a metamorphic rock. Marble forms when pre-existing limestone rock is heated to such extreme temperature that the minerals grow larger. Marble is used for its beauty in architecture and scripture. It is used for chemical properties in agriculture. It is used for in cosmetics paint and paper.

Q73. Answer: (c) Bone

The Correct Answer is Bone.

• The bone is a connective tissue that includes cells, fibres and substances from the earth.

• In the body in which the bone participates, there are many functions, such as storing minerals, providing internal support, protecting vital organs, allowing movement, and providing muscles and tendons with attachment sites. Its extracellular components are mineralized, unlike other connective tissues, giving it significant strength and rigidity.

• This makes the bone ideally suited to perform its most recognised mechanical support function within the body.

• About 80 per cent of the mass of skeletal tissue is made up of cortical (or compact) bone.

Important Points

• In vascular plants, the vascular bundle is a part of the transport system.

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• The vascular cambium provides the inner soft bark or bast; it is composed of secondary phloem tissue whose innermost layer transmits food to the rest of the plant from the leaves.

Q74. Answer: (b) density of a substance / density of water.

The Correct Answer is density of a substance/density of water.

Key Points

• Relative density is equal to the density of a substance/density of water.

• For liquids, the specific gravity is almost always determined with respect to the densest water (at 4 ^oC or 39.2 °F); for gases, air at room temperature (20 °C or 68 °F) is the reference.

• If the relative density of the material is less than one(Relative Density < 1), it is less dense than the reference; if it is greater than 1(Relative Density > 1), it is denser than the reference.

• The densities are equal if the relative density is exactly 1; that is, the same amounts of the two substances have the same mass.

• If water is the reference material, then a substance with less than 1 relative density (or specific gravity) can float in water.

Q75. Answer: (b) [figure]

The logic is:

The dotted lines of the square become a continuous line in the second figure and the continuous line of the circle becomes dotted lines in the second figure.

Similarly,

Hence, ‘option 2’ is the correct answer.

Q76. Answer: (a) Dharamshala

The Correct Answer is Dharamshala.

• Dharamshala is the second capital of Himachal Pradesh.

• Dharamshala is the district headquarters of Himachal Pradesh's Kangra district.

• Kangra district is part of the British province of Punjab.

• The administrative headquarters of the district were initially at Kangra, but were transferred in 1855 to Dharamshala.Under the flagship Smart Cities Mission of PM Narendra Modi, Dharamshala was selected as one of the hundred Indian cities to be built as a smart city.

• Former Chief Minister Virbhadra Singh proclaimed Dharamshala the second capital of the state of Himachal Pradesh on 19 January 2017, making Himachal Pradesh, after Jammu and Kashmir and Maharashtra, the third state of India with two capitals.

Important Points

• Shimla is the summer capital of Himachal Pradesh.

• Himachal Pradesh Formation - 25 January 1971

• Chief Minister of Himachal Pradesh - Sukhvinder Singh Sukhu

• Governor of Himachal Pradesh - Shiv Pratap Shukla

• Official Language - Hindi

Q77. Answer: (d) 3

Considering the given equation

$S = 6 + [(16 – 4) ÷ (2^2 + 2)] – 2$

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

Now,

$\Rightarrow S = 6 + [(16 – 4) ÷ (6)] – 2$

$\Rightarrow S = 6 + 12 ÷ 6 – 2$

$\Rightarrow S = 6 + 2 – 2$

$\Rightarrow S = 6$

$\Rightarrow S/2 = 3$

Q78. Answer: (b) 5

Number of customers who chose service2 = (Number of customers who chose only service 1 and service 2) + (Number of customers who chose only service 2 and service 3) + (Number of customers who chose only service 2) + (Number of customers chose all the three services)

$35 = \{(10 - x) + (15 - x) + (15) + (x)\}$

$35 = 40 - x$

x = 5

Hence 5 customers chose all the three services.

Q79. Answer: (c) 86%

The Correct Answer is 86%.

Key Points

• On 28 October 2016, India's total banknotes in circulation were estimated at about 17.77 lakh crore; it was unclear what proportion of this originated from between 500 and 1,000 banknotes.

• The Reserve Bank of India (RBI) reported in its March 2016 annual report that total banknotes in circulation were valued at 16.42 lakh crore, of which nearly 86% (about 14.18 lakh crore) were derived from 500 and 1,000 banknotes.

• In terms of volume, the report stated that Rs. 500 and Rs. 1,000 banknotes were 24 per cent of the total 9026.6 crore banknotes in circulation.

• Until demonetisation (November 2016), the industry had banknotes priced at 17.97 lakh crore.

• The demonetised banknotes made up 86.4% of that amount. In March 2018, the banknotes in circulation hit the amount prior to demonetisation. There were banknotes worth 18.03 lakh crore in the market by March 2018; a rise of 9.9 per cent.

• 80.6 per cent of it is made up of new banknotes of 2,000 and 500. So there was just a 5.8 per cent rise in small banknotes for supremacy.

Q80. Answer: (d) 96^(th)

The Correct Answer is 96th.

Key Points

• In 2017, The best world ranking secured by India according to the FIFA world ranking was 96^(th).

• Indian national football has managed to capture the 96th spot, moving up four positions, according to the revised FIFA world football rankings. India had earlier been put in 100th spot.

• This is the highest ranking India has earned in 21 years. India was ranked 101st in April's FIFA rankings. In March 2015, the new ranking is much better off than the 173rd rank secured.

• India has been ranked 134th on average since the beginning of the world ranking system. India managed to secure 94th place in 1996. It remains the country's best ever FIFA ranking to date.

• Germany tops the rankings at present. In the rankings, Germany is followed by Brazil, Argentina, Portugal, and Switzerland.

Q81. Answer: (c) raising it from the ground to that point against gravity

The Correct Answer is raising it from the ground to that point against gravity.

Key Points

• The gravitational potential energy of an object at a point above the ground is defined as the work done in raising it from the ground to that point against gravity.

• Gravitational energy, such as elevating objects against the gravity of the Earth, is the potential energy correlated with gravitational force.

• If an object falls within a gravitational field from one point to another point, the gravity force will do positive work on the object, and the gravitational potential energy will decrease by the same amount.

• Near the surface of the Earth, the product mgh is the work performed in raising an object through a height h, so U = mgh

• The Newton's law of gravitation: This law states that every point mass in the universe attracts every other point mass with a force that is directly proportional to the product of its masses and inversely proportional to the distance between them in the square.

Q82. Answer: (d) 4

Shortcut Trick

The given expression is in the form of $((a + b)^2 - (a - b)^2) \div (ab)$.

Using the standard algebraic identity: $(a + b)^2 - (a - b)^2 = 4ab$.

Substituting this into the expression: $4ab \div ab = 4$.

The result is independent of the values of a and b.

Therefore The correct answer is 4.

Alternate Method

Given:

Expression = $((469 + 174)^2 - (469 - 174)^2) \div (469 \times 174)$

Formula Used:

1. $(a + b)^2 = a^2 + 2ab + b^2$

2. $(a - b)^2 = a^2 - 2ab + b^2$

Calculation:

=> Let a = 469 and b = 174.

=> Numerator = $(a + b)^2 - (a - b)^2$

=> Numerator = $(a^2 + 2ab + b^2) - (a^2 - 2ab + b^2)$

=> Numerator = $a^2 + 2ab + b^2 - a^2 + 2ab - b^2$

=> Numerator = 4ab

=> Expression = (Numerator) ÷ (ab)

=> Expression = 4ab ÷ ab

=> Expression = 4

Therefore The correct answer is 4.

Additional Information

Sum of Squares Identity

Another useful identity is $(a + b)^2 + (a - b)^2 = 2(a^2 + b^2)$, often used in complex fraction simplifications.

Difference of Two Squares

$a^2 - b^2 = (a + b)(a - b)$. This is frequently used to simplify denominator rationalization.

Cubic Identities

Quick formulas like $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$ help solve questions with three-digit numbers instantly.

Q83. Answer: (b) 754.6 J

The Correct Answer is 754.6 J.

• Given,

Mass of object m=11kg

Height h = 7 m

Acceleration due to gravity g = 9.8 m/s^2

Potential Energy of object P.E=m×g×h

mgh= 11x9.8x7 = 754.6 Joule

• Energy possessed by the object is 754.6 Joule.

Q84. Answer: (c) Neither 1 nor 2 follows.

The least possible venn diagram is:

1. Some danger are metals. → False (It can be possible, but it is not definite)

2. Some red are metals. → False (As, No metals are red)

Hence, neither 1 nor 2 follows.

Q85. Answer: (c) 48 hours

Shortcut Trick

Net Efficiency = Efficiency(A) + Efficiency(B) − Efficiency(C)

Total Work = LCM(12, 16, 8) = 48 units

Efficiencies: A = 4, B = 3, C = 6

Net Efficiency = 4 + 3 − 6 = 1 unit/hr

Time = 48 ÷ 1 = 48 hours

Therefore The correct answer is 48 hr.

Alternate Method

Given: Filling time Tap A = 12 hr, Tap B = 16 hr; Emptying time Tap C = 8 hr.

Formula Used: Net Work Rate = (1/A) + (1/B) − (1/C)

Person

Days

Total Work

Efficiency

Tap A

12

48

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4

Tap B

16

3

Tap C

8

−6

=> Total capacity of the tank = LCM of (12, 16, 8) = 48 units.

=> Efficiency of Tap A = 48 ÷ 12 = +4 units/hr.

=> Efficiency of Tap B = 48 ÷ 16 = +3 units/hr.

=> Efficiency of Tap C = 48 ÷ 8 = −6 units/hr (negative as it empties).

=> Combined Efficiency = 4 + 3 − 6 = 1 unit/hr.

=> Total time required = Total Work ÷ Net Efficiency = 48 ÷ 1 = 48 hours.

Therefore The correct answer is 48 hr.

Additional Information

Inlet and Outlet Pipes

Inlet pipes fill the tank (positive work), while outlet pipes empty the tank (negative work).

Pipes and Cisterns Logic

If a pipe fills a tank in x hours and another empties it in y hours (y > x), then net part filled in 1 hour is (1/x − 1/y).

Efficiency Concept

Efficiency is inversely proportional to time. Higher the efficiency, lesser the time taken to complete the work.

Q86. Answer: (c) B

The figure that will complete the given series is shown below:

In 2^(nd) figure as compared to 1^(st) figure, the circle comes out of the open box and is bigger in shape, while the open box is now above the circle and is smaller in shape.

Similarly,

In 4^(th) figure circle will come out and will be bigger in shape, while the arrow face will be above the circle, as shown in answer figure B.

Hence, ‘option 3’ is the correct answer.

Q87. Answer: (b) Tamralipti

The correct answer is Tamralipti.

Key Points

• I-tsing, a Chinese traveller, stayed at Tamralipti for three years and learned Sanskrit.

• Formerly recognized as I-tsing, Yijing was a Chinese Buddhist monk of the Tang-era who was regarded as a traveller and translator.

• An important source for the history of the mediaeval kingdoms along the sea route between China and India, especially Srivijaya in Indonesia, is his account of his travels.

Confusion Points

• Fa-Hein was the first traveller who visited India from China.

• He studied the Sanskrit language for about three years in the city of Patliputra.

Additional Information

• Born in 635 AD in Fan-Yang (modern Cho-Chou) near present-day Beijing, he began a secular education at the age of seven.

• In 654, I-tsing spent five years in the study of the rules of discipline (Vinayapitaka) which remained his main interest and formed the main topic of his writing.

• The pilgrim was aware of fa-hien's travels and also of the immediate example of hiuen-tsang, - he was in Changan when Hiuen-tsang's funeral took place there in 664 AD - and was inspired by them to go to India.

• I-tsing left for India from Canton by sea in 671, arriving in India in 673.

• After visiting the sacred Buddhist sites in Magadha, he resided at the great Nalanda monastery for ten years (676-685), devoting himself to the study of the Vinya.

• He left India in 685 for the city of Shri Bhoja (or Sri Boja, known as Shri Vijaya, ie Palembang in Sumatra), which at that time was very much under the cultural influence of India. Here he devoted himself to the translation of Buddhist Sanskrit texts.

• In 689 I-tsing returned to China to obtain assistance for his translations. He then returned to Sri Vijaya, and remained there for

five more years, returning to China in 695 during the reign of the well-known patron of Buddhism, the Empress Wu Zetian.

• Thus, I-tsing's stay abroad roughly covers a period of twenty-five years (671-695). He received much acclaim on his return, but like his predecessor Hiuen-tsang, I-tsing devoted the remaining years of his life to the translation of Buddhist works.

• He died in 713 AD at the age of 79, during the reign of the Chinese Emperor Zhongzong.

Q88. Answer: (d) Rs. 1,848

Shortcut Trick

Ratio of Length (L) and Breadth (B) = 4 : 3

Area unit square = 1452 ÷ (4 × 3) = 1452 ÷ 12 = 121

Common ratio factor (x) = √121 = 11 m

Perimeter = 2 × (4 + 3) × 11 = 2 × 7 × 11 = 154 m

Total Cost = 154 × 12 = Rs. 1848

Therefore The correct answer is Rs. 1848.

Alternate Method

Given: Ratio of Length (L) and Breadth (B) = 4 : 3. Area = 1452 m². Rate of fencing = Rs. 12/m.

Formula Used: Area of Rectangle = L × B | Perimeter = 2(L + B) | Total Cost = Perimeter × Rate

=> Let Length = 4x and Breadth = 3x

=> Area = 4x × 3x = 12x²

=> 12x² = 1452

=> x² = 1452 ÷ 12 = 121

=> x = √121 = 11

=> Length = 4 × 11 = 44 m; Breadth = 3 × 11 = 33 m

=> Perimeter = 2 × (44 + 33) = 2 × 77 = 154 m

=> Total Cost = 154 × 12 = Rs. 1848

Therefore The correct answer is Rs. 1848.

Additional Information

Perimeter of a Rectangle

The total distance around the boundary, calculated as P = 2(l + b), where l is length and b is breadth.

Area of a Rectangle

The total surface enclosed within the boundary, calculated as A = l × b.

Cost Calculation

For fencing, cost is calculated on perimeter. For leveling/ploughing, cost is calculated on area.

Q89. Answer: (b) 1 pm

Shortcut Trick

Relative Speed concept: Distance covered by Train A in 2 hours = 70 × 2 = 140 km.

Remaining distance at 11 am = 320 − 140 = 180 km.

Relative speed (opposite direction) = 70 + 20 = 90 kmph.

Time taken to meet = 180 ÷ 90 = 2 hours.

Meeting time = 11 am + 2 hours = 1 pm.

Therefore The correct answer is 1 pm.

Alternate Method

Given:

Speed of Train 1 (S1) = 70 kmph

Speed of Train 2 (S2) = 20 kmph

Total Distance = 320 km

Calculations:

=> Distance traveled by first train from 9 am to 11 am = Speed × Time = 70 × 2 = 140 km

=> Remaining Distance = 320 − 140 = 180 km

=> Relative Speed = S1 + S2 = 70 + 20 = 90 kmph

=> Meeting Time from 11 am = 180 ÷ 90 = 2 hours

=> Final Meeting Time = 11:00 am + 2 hours = 1:00 pm

Therefore The correct answer is 1 pm.

Additional Information

Relative Speed

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

Time of Meeting

Time = (Initial distance between them at the same start time) ÷ (Relative Speed).

Average Speed

Average Speed = Total Distance ÷ Total Time. For same distance, Avg Speed = 2S1S2 ÷ (S1 + S2).

Q90. Answer: (d) Gopala

The Correct Answer is Gopala.

• Gopala was the first king of the Pala Dynasty.

• Gopala was the founder of the Pala Dynasty of the Indian Subcontinent's Bengal region (ruled c. 750s-770s CE). About 750 CE in Gaur, he came to power after being elected by a coalition of regional chieftains.

• During the post-classical era of the Indian subcontinent, which emerged in the area of Bengal, the Pala Empire was an imperial power.

• It is named after its ruling family, whose rulers had names that ended with the Pala suffix.

Important Points

• The most powerful ruler of the Pala Empire of the area of Bengal in the Indian Subcontinent was Devapala (9th century). He was the third king in the line, succeeding his Dharamapala father.

• In the Bengal region of the Indian subcontinent, Madanapala (ruled 1144-1162 CE) was the successor to Pala king Gopala III and the eighteenth and final ruler of the Pala lineage for 18 years.

Q91. Answer: (b) Only A is true

The Correct Answer is Only A is true.

Key Points

• An ion is an atom or a group of atoms that does not equal the number of electrons to the number of protons.

• Electrons have a negative charge, whereas there is a positive charge for protons.

• This results in a negative charge when an atom gains electrons. An anion is called this form of ion.

• This results in a positive charge when an atom loses electrons. A cation is considered a positively-charged ion.

• Usually, positive ions are metals or behave like metals.

• Just like atoms may lose electrons to become cations, others can absorb electrons and become anions that are negatively charged.

Q92. Answer: (c) 67 km / h, 60 km / h

Shortcut Trick

Total distance covered by both trains in 2 hours = 380 − 126 = 254 km.

Combined speed (Relative speed) = 254 ÷ 2 = 127 kmph.

Sum of speeds = 127 kmph and Difference of speeds = 7 kmph.

Speed of faster train = (127 + 7) ÷ 2 = 67 kmph.

Speed of slower train = 127 − 67 = 60 kmph.

Therefore The correct answer is 67 km / h, 60 km / h.

Alternate Method

Given: Total distance = 380 km, Distance remaining = 126 km, Time = 2 hours, Speed difference = 7 kmph.

Formula Used: Speed = Distance ÷ Time; Relative Speed (Opposite direction) = S1 + S2

=> Let the speed of the slower train be x kmph. Then the speed of the faster train is (x + 7) kmph.

=> Distance covered by Train 1 + Distance covered by Train 2 = Total Distance − Remaining Gap

=> 2 × (x + 7) + 2 × x = 380 − 126

=> 2x + 14 + 2x = 254

=> 4x = 254 − 14

=> 4x = 240

=> x = 60 kmph

=> Speed of faster train = 60 + 7 = 67 kmph

Therefore The correct answer is 67 km / h, 60 km / h.

Additional Information

Relative Speed

When two objects move in opposite directions, their relative speed is the sum of their individual speeds (S1 + S2).

Average Speed

For a trip with two equal distances at speeds a and b, the Average Speed = 2ab ÷ (a + b).

Unit Conversion

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

Q93. Answer: (c) [figure]

In all the options except '3', there is a common region shared by the two figures or generally we can say that there is an intersection between the two figures, while in option '3', there is no such intersection or common region.

Hence, 'option 3' is the odd one out.

Q94. Answer: (d) 20

Shortcut Trick

Total sum of three numbers = 15 × 3 = 45.

Range (9) is divided by the middle number in a 1 : 2 ratio => Gaps are 3 and 6.

If all numbers were equal to the largest number, the sum would increase by the gaps: 45 + 6 (from middle) + 9 (from least).

3 × Largest number = 45 + 15 = 60.

Largest number = 60 ÷ 3 = 20.

Therefore The correct answer is 20.

Alternate Method

Given: Mean = 15, Range = 9, Difference (Largest − Middle) = 2 × (Middle − Least).

=> Let the numbers be x, y, and z in increasing order.

=> Sum = 15 × 3 = 45

=> Range = z − x = 9

=> Gap condition: (z − y) = 2(y − x)

=> Let (y − x) = d, then (z − y) = 2d

=> Total Range = (y − x) + (z − y) = d + 2d = 3d

=> 3d = 9 => d = 3

=> y = x + 3 and z = x + 9

=> x + (x + 3) + (x + 9) = 45

=> 3x + 12 = 45

=> 3x = 33 => x = 11

=> z = 11 + 9 = 20

Therefore The correct answer is 20.

Additional Information

Arithmetic Mean

The average of a set of numbers, calculated by dividing the sum of all elements by the total count: Mean = (Σx_i) ÷ n.

Range of Data

The absolute difference between the maximum value and the minimum value in a dataset: Range = Max − Min.

Linear Deviations

The sum of deviations of all observations from the mean is always zero. This property helps in solving missing value problems quickly.

Q95. Answer: (b) Telugu Desam Party

The Correct Answer is Telugu Desam Party.

• Telugu Desam Party is an Indian State Political Party is led by N. Chandra Babu Naidu.

• In Andhra Pradesh and Telangana, the Telugu Desam Party is a regional Indian political party active in the southern states.

• The party was founded on 29 March 1982 by N. T. Rama Rao. Since 1995, the party has been led by the former Chief Minister of Andhra Pradesh, Chandrababu Naidu.

• The headquarters for the party is situated at NTR Bhavan in Hyderabad.

• In 1983, within nine months of the party's founding, Rama Rao became Andhra Pradesh's 10th Chief Minister, thus establishing

the first non-Indian National Congress (INC) government in Andhra Pradesh. From 1984 to 1989, the TDP was the first regional party to become the largest opposition party at the 8th Lok Sabha.

• The TDP left the National Democratic Alliance of Prime Minister Narendra Modi on 16 March 2018 (NDA).

Important Points

• The founder of All India Forward Bloc was Subhas Chandra Bose.

• In India Against Corruption movement organised by Anna Hazare and Arvind Kejriwal, the AAP(Aam Aadmi Party) has its roots.

• Asom Gana Parishad(AGP) was the result of the six-year Assam Agitation led by the All Assam Students' Union against illegal infiltration into Assam by foreigners from Bangladesh.

Q96. Answer: (c) R = 2f

The Correct Answer is R = 2f.

• The lens focal length (f) is the distance between the centre of the lens and the point at which the reflected light meets the centre line of a beam of light moving parallel to the centre line (principal axis).

• The curvature radius (r) is the radius of a full sphere that forms the lens.

• The red line reflects the light that enters the lens (AB) and that reflects off the lens (BF).

• We know that the green line, RB, which reflects the circle's radius line, bisects the ABF angle since the lens is always at the right angle.

• The angles of ABR and RBF are therefore equivalent. Because of the law of alternate angles, we also know that angle ABR is equal to angle BRF. Therefore the triangle BRF is a triangle of isosceles. The BF and RF lines are therefore equivalent.

• We also know that for lenses that are thin, BF and FC are about equal.

• Therefore:

• RF=BF=FC

• RC=RF+FC=FC+FC=2FC

• R=2f

• Therefore, the radius(R) of curvature is twice the focal length(f).

Q97. Answer: (c) 350 m

Shortcut Trick

Time to cross pole (train length) = 18 seconds.

Time to cross platform (train + platform) = 39 seconds.

Time taken to cover platform length only = 39 − 18 = 21 seconds.

Length of platform = (300 ÷ 18) × 21 = 350 m.

Therefore The correct answer is 350 m.

Alternate Method

Given:

Length of train (L_T) = 300 m

Time to cross pole (t1) = 18 seconds

Time to cross platform (t2) = 39 seconds

Formula Used:

Speed = Distance ÷ Time

Calculations:

=> Speed of train = 300 ÷ 18 = 50/3 m/s

=> Total distance while crossing platform = Speed × t2

=> 300 + Length of platform = (50/3) × 39

=> 300 + Length of platform = 50 × 13

=> 300 + Length of platform = 650

=> Length of platform = 650 − 300 = 350 m

Therefore The correct answer is 350 m.

Additional Information

Relative Speed

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

Unit Conversion

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

Crossing Objects

To cross a stationary point (pole/man), distance = length of train. To cross a platform/bridge, distance = length of train + length of object.

Q98. Answer: (c) B

The mirror image of the given figure with respect to the line AB is shown below:

Hence, ‘option 3’ is the correct answer.

Q99. Answer: (b) Ranchi

The Correct Answer is Ranchi.

• Ranchi is the capital of Jharkhand.

• The center of the Jharkhand movement was Ranchi, which called for a separate state for the tribal areas of western West Bengal, South Bihar, northern Orissa, and the eastern part of what is now Chhattisgarh.

• By dividing the Bihar divisions of Santhal Parganas and Chota Nagpur, the Jharkhand state was created on 15 November 2000.

• Ranchi has been selected as one of the hundred Indian cities to be constructed as a smart city under PM Narendra Modi's flagship Smart Cities Mission.

Important Points

• The Jharkhand state shares its boundaries with the northern states of Bihar, northwest of Uttar Pradesh, west of Chhattisgarh, south of Odisha, and east of West Bengal.

• It has 79,710 km² of surface area. It is by area the 15th largest state and by population the 14th largest. Hindi is the state's official language.

Additional Information

• Patna is Bihar's largest and capital city.

• Patna is an ancient city in Bihar, northeast India, that spreads along the south bank of the Ganges River.

Q100. Answer: (a) 24 years, 18 years

Let the age of the man be a.

At the time of marriage, a man was 6 years older than his wife.

Age of man’s wife = a – 6

But after 12 years of marriage, his age is 1.2 times that of his wife.

According to question:

(a + 12) = 1.2 (a – 6 + 12)

a + 12 = 1.2 (a + 6)

a + 12 = 1.2a + 7.2

a – 1.2a = 7.2 – 12

0.2a = 4.8a

a = 24

So, the man’s age was 24 years and his wife’s age was (24 – 6) = 18 years.

Hence, ‘24 years, 18 years’ is the correct answer.

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