RRC Group D Previous Year Paper 71 (Held On: 5 Nov 2018 Shift 1)

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

Take this paper as a timed mock test

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

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

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

CBT

Q1. In the code language, FAIL is written as UZRO. What is the code for PASS?

(a) KZHH
(b) KWHH
(c) LZHH
(d) KYHH

Q2. Rajya Sabha member Praful Manoharbhai Patel belongs to _____.

(a) BJP
(b) INC
(c) Shiv Sena
(d) NCP

Q3. _____ Empire was founded by Hasan Gangu in 1347.

(a) Sangma
(b) Bahmani
(c) Kakatiya
(d) Vijayanagar

Q4. Which of the given two statements A and B is/are true?

What is the force of gravity:

A. It is directly proportional to the product of the masses of the two objects.

B. It is directly proportional to the square of the distance between two objects.

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

Q5. Given that the weight of a 1-mole atom of oxygen is 16g. What is the molecular weight of ozone?

(a) 32 g/mol
(b) 48 g/mol
(c) 64 g/mol
(d) 16 g/mol

Q6. The 2017 Deaflympics was held in _____.

(a) Istanbul, Turkey
(b) Samsun, Turkey
(c) Ankara, Turkey
(d) Budapest, Hungary

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Q7. The first and second groups of the modern periodic table are called?

(a) b-block
(b) s-block
(c) o-block
(d) p-block

Q8. Out of total 85 students, 35 took Mathematics, 33 took Biology, while 23 students did not choose these two subjects. How many students opted for both Mathematics and Biology subjects?

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

Q9. Nm^(–2) is the international (SI) unit of _____.

(a) force
(b) thrust
(c) momentum
(d) pressure

Q10. A mini van passes two persons moving in the same direction at 5.4 km/h and 6 km/h such that the mini-van is moving at 4.5 sec and 6.75 sec respectively. What is the length of the mini-van?

(a) 2.75 meter
(b) 2 meter
(c) 2.5 meter
(d) 2.25 meter

Q11. The marked price of the laptop is Rs 22,000. The discount given is 12 1/2 %. VAT is charged at 10%. How much will the customer have to pay for the laptop?

(a) Rs. 21,175
(b) Rs. 21,275
(c) Rs. 21,715
(d) Rs. 21,517

Q12. Select the option which is related to the third term in the same way as the second term is related to the first term.

North America : Canada :: Europe : ?

(a) Mexico
(b) Spain
(c) Egypt
(d) China

Q13. Ramesh credited 15% of his salary in his fixed deposit account and spent 30% of the remaining amount on getting groceries. If he has Rs. 2,380 is cash, then what is his salary?

(a) Rs. 2,380
(b) Rs. 4,500
(c) Rs. 4,000
(d) Rs. 2,800

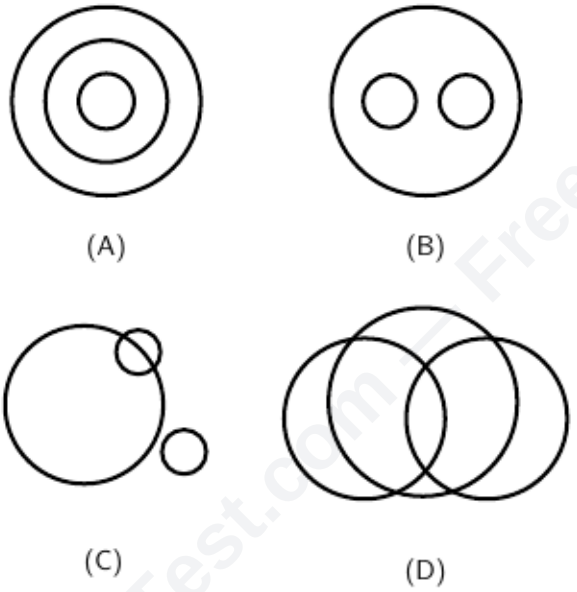
Q14. Who among the following has been appointed as the independent director of the International Cricket Council (ICC), on February 9, 2018?

(a) Sachin Tendulkar
(b) Jagmohan Dalmiya
(c) indra nooyi
(d) Sourav Ganguly

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Q15. Choose the Venn diagram that best represents the three classes given in the question below:

Copper, Book, Wire



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

Q16. Complete the given alphabetical series:

A, C, F __, ___, U

(a) I, P
(b) J, O
(c) I, O
(d) J, P

Q17. Hari invested Rs.100 for three years at a simple interest rate of 11.03%. How much should Tipu invest to get the same amount after three years, but at 10% compound interest?

(a) Rs. 120
(b) Rs. 110
(c) Rs. 100
(d) Rs. 105

Q18. Fill in the blanks using the correct option for the following statements from the given alternatives. On heating _____, plaster of paris is obtained.

(a) Carbonic acid
(b) Baking soda
(c) Gypsum
(d) Calcium Carbonate

Q19. _____ is a part of DNA, which provides information for a protein.

(a) Chromosome
(b) Nucleus
(c) Trait
(d) Gene

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Q20. Arun gifted Vijay a watch, which moves forward by 5 seconds every 3 minutes. It was set right at 7 in the morning. That same day, it was quarter past four in the afternoon. Find the exact time?

(a) 4 p.m.
(b) 587 minutes more than 03:11 p.m.
(c) 597 minutes more than 3:12 p.m.
(d) 23 minutes more than 04:11 p.m.

Q21. Find the value of :

$\tan \frac{\pi}{24} \tan \frac{3\pi}{24} \tan \frac{5\pi}{24} \tan \frac{7\pi}{24} \tan \frac{9\pi}{24} \tan \frac{11\pi}{24} \tan \frac{16\pi}{24}$

(a) $\sqrt{3}$
(b) -1
(c) 1
(d) $-\sqrt{3}$

Q22. When is National Youth Day celebrated in India?

(a) 12 July
(b) 15 December
(c) 12 January
(d) 12 November

Q23. Who suggested that life evolved from simple inorganic (abiotic) molecules?

(a) Murey
(b) Darwin
(c) Haldane
(d) Mendel

Q24. What was the day on 5th august, 1987?

(a) Tuesday
(b) Thursday
(c) Saturday
(d) Wednesday

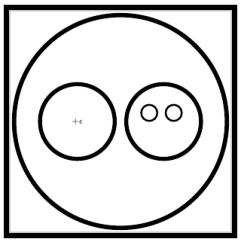
Q25. Narendra and Sunil are facing north direction. Narendra rotates 45º clockwise and then again 45º clockwise. How much will Sunil have to rotate so that they both face each other?

(a) 180º anticlockwise
(b) 180º clockwise
(c) 90º anticlockwise
(d) 45º clockwise

Q26. Choose the best suitable Venn diagram for the following words:

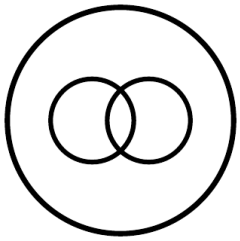
"Sun, Jupiter, Solar System"

(a)

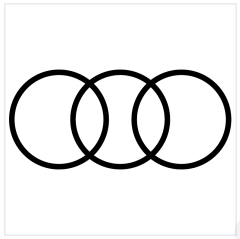


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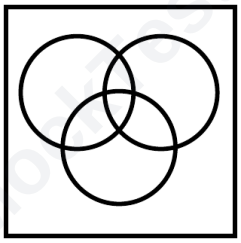
(b)



(c)



(d)



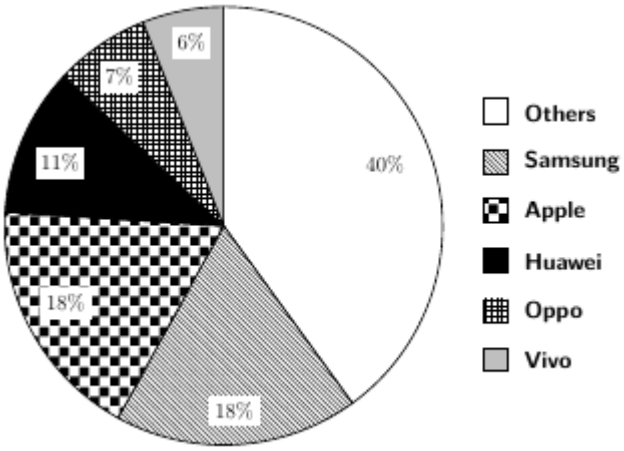
Q27. Political leader Sudesh Mahto is from which of the following Indian states?

(a) Bihar
(b) Odisha
(c) Jharkhand
(d) West Bengal

Q28. A and B can do a piece of work in 12 and 16 days respectively. Together they do that work together for 3 days, then A leaves. Then in how many days will B alone complete the remaining work?

(a) 12
(b) 18
(c) 9
(d) 10

Q29. The given pie chart shows the total sales made by different mobile companies in the year 2017.



If the total sales in the year 2017 is Rs. 5,000 crores, then the total sales made by the Huawei company was Rs. _____ crores.

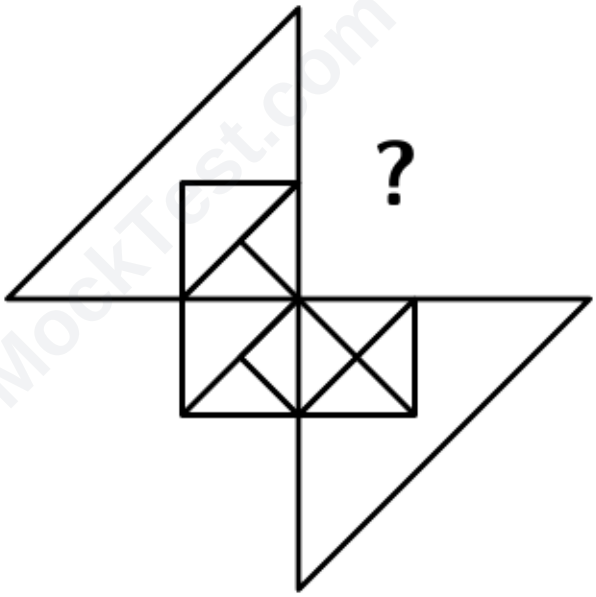
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(a) 2000
(b) 550
(c) 350
(d) 900

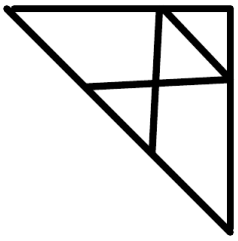
Q30. Which of the following is a film based on the life of a girl who climbed Mount Everest at a young age (13 years 11 months)?

(a) Newton
(b) Shabd
(c) Secret superstar
(d) Poorna

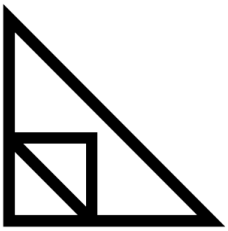
Q31. Choose the correct figure from the options given below, which is suitable for the above blank space (?).



(a)

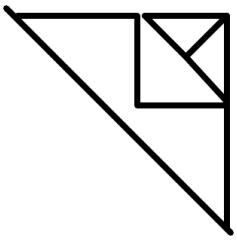


(b)

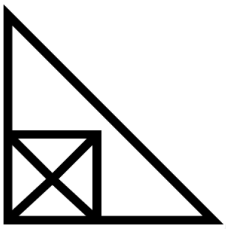


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(c)



(d)



Q32. Who is the Union Minister of Science and Technology at present (as of July 2018)?

(a) Mahesh Sharma
(b) Ravi Shankar Prasad
(c) Dr. Harsh Vardhan
(d) Suresh Prabhu

Q33. Which of the following is the tube that originates from the heart and carries blood to various organs in the body?

(a) Veins
(b) Blood cell to lung
(c) Artery
(d) Pulmonary arteries

Q34. Read the given question and decide which of the following statements are sufficient to answer the question.

Question:

Latika has 25 boxes of three colors and three different sizes (small, medium and big). How many oversized blue boxes does he have?

Statements:

1. The number of big box is half of the number of medium box.
2. There are 10 small blue colored boxes.
3. The number of medium boxes of green and red color is same.

(a) Statements 1, 2 and 3 together are not sufficient.
(b) Statement 1 alone is sufficient.
(c) Statement 2 alone is sufficient.
(d) Statements 1, 2 and 3 together are sufficient.

Q35. Pandit Narayanrao Bodas belonged to which Gharana of Hindustani classical music?

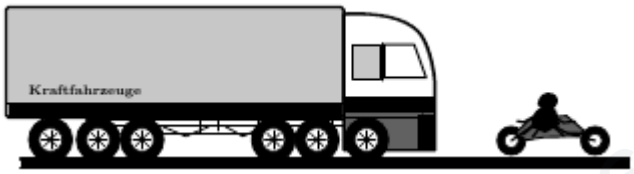
(a) Kirana Gharana
(b) Banaras Gharana
(c) Rampur Gharana
(d) Gwalior Gharana

Q36. It is a religious city located in the state of Odisha in India.

(a) Saputara
(b) Puri
(c) Naina Devi
(d) Katra

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Q37. What can be inferred regarding energy from the given figure?

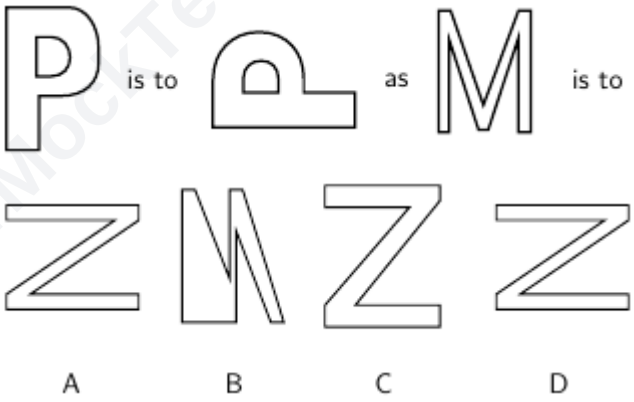


(a) The gravitational potential energy is in both the vehicles.
(b) Two vehicles are moving fast using high energy.
(c) Both vehicles are converting mechanical energy into muscular energy.
(d) Both vehicles have kinetic energy.

Q38. Which of the following is a folk sport from rural Appalachia?

(a) Opera
(b) Hillbilly music
(c) Rasta Music
(d) Reggae

Q39. Select the term which is related to the third term in the same way as the second term is related to the first term.



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

Q40. In a class of 45 students, the ratio of boys to girls is 4 : 5. The average marks of boys is 75 and the average marks of girls is 82. What is the average marks of the entire class?

(a) 78.6
(b) 78.5
(c) 78.9
(d) 79.0

Q41. If the velocity is doubled, then

(a) Momentum increases by 3 times and kinetic energy by 4 times
(b) Momentum increases by 4 times and kinetic energy increases by 3 times
(c) Momentum increases by 2 times and kinetic energy by 4 times
(d) Momentum increases by 4 times and kinetic energy by 2 times

Q42. This question is in Hindi. Read it online.

Q43. There are 70 patients in a naturopathy hospital. It has three facilities (clay/steam/oil bath). 15 chose a clay and oil bath. 8 chose clay and steam bath. 9 chose oil and steam bath. 35 chose only 1 type of bath. How many chosen all three types of the bath?

(a) 3
(b) 9

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(c) 12
(d) 2

Q44. Which of these agricultural products earns maximum export value in the market?
(a) Spices
(b) Cotton
(c) Coffee
(d) Basmati rice

Q45. Who won the Best Actress in a Leading Role award at Jio Filmfare Awards 2018?
(a) Deepika Padukone
(b) Radhika Apte
(c) Vidya balan
(d) Kareena kapoor

Q46. The interest accruing on a certain sum of money at 10% in one year is Rs. is 400. Calculate the compound interest for the same sum of money at the same rate and for the same period, if the interest is compounded half yearly.
(a) Rs. 400
(b) Rs. 210
(c) Rs. 410
(d) Rs. 200

Q47. If a = 0.125 then what is value of $\sqrt{(4a^2 - 4a + 1)} + 3a$?
(a) 1.500
(b) 1.125
(c) 1.250
(d) 1.225

Q48. A meaningful word is formed by taking the letters at positions 1, 19, 20, and 25 of ABCDEFGHIJKLMNOPQRSTUVWXYZ. The second letter of that meaningful word is:
(a) T
(b) O
(c) M
(d) Y

Q49. In which of the following the heart has only two chambers?
(a) Salamander
(b) Cobra
(c) Frog
(d) Rohu

Q50. According to the World Bank's Global Economic Prospects Report 2018, India may top the list as the fastest growing economy with a growth rate of _____.
(a) 8.0%
(b) 7.3%
(c) 6.3%
(d) 5.4%

Q51. Consider the given statement and state which of the given assumptions are implicit in the statement.

Statement:

A notice indicating, "Don't spill the trash; please use the dustbin."

Assumptions:

1. People often do not follow instructions.
2. People tend to read notices and follow instructions.

(a) Either assumption 1 or 2 assumption is implicit.

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(b) Neither assumption 1 nor 2 is implicit.
(c) Only assumption 1 is implicit.
(d) Only assumption 2 is implicit.

Q52. Which of the following does not belong to this group?

A. well
B. pond
C. mug
D. Lake

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

Q53. Read the given question and decide which of the following statements are sufficient to answer the question.

Question:
Which word represents 'Mangoes' in the code language?
Statements:
1. "I love Mangoes" is written as 'E la mange'.
2. 'I love Orange' is written as 'E la orage'.

(a) Only statement 1 is sufficient
(b) Both Statements 1 and 2 are not sufficient.
(c) Both Statements 1 and 2 are sufficient.
(d) Only statement 2 is sufficient

Q54. The British divided the regions in India into the provinces of Bengal, Bombay and Madras called _____.

(a) Presidency
(b) Constituency
(c) Subdivision
(d) Sectors

Q55. The length of each side of the polygon is 2.9 cm and its circumference is 17.4 cm. How many sides does a polygon have?

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

Q56. A man clapped near the rock and heard the echo after 4 seconds. Then what is the distance of the rock from the person?

(speed of sound = 346m/s)

(a) 1384 m
(b) 173 m
(c) 692 m
(d) 346 m

Q57. Aparna Popat is related to which sport?

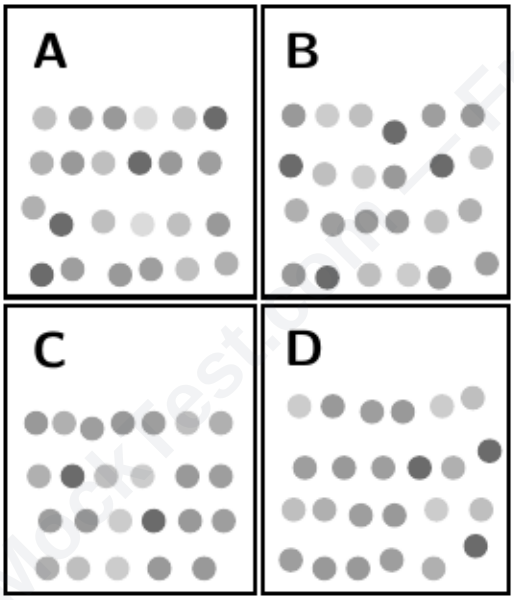
(a) Chess
(b) Badminton
(c) Tennis
(d) Hockey

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Q58. What is the object called through which sound is transmitted?

(a) Material
(b) Trembling
(c) Medium
(d) Machine

Q59.



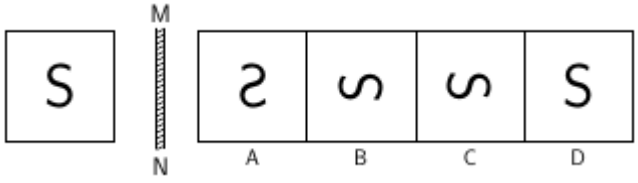
Select the shape that is different in the group.

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

Q60. Which union ministry organizes the National Film Awards every year?

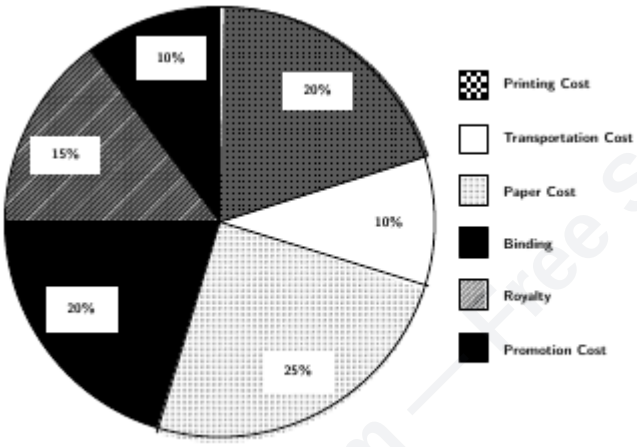
(a) Culture and Tourism
(b) Home Ministry
(c) Youth affairs
(d) Information and Broadcasting

Q61. Select the mirror image for the figure given below:



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

Q62.



The given pie diagram shows the expenditure of a publishing house in Karnataka. If the total expenditure is Rs. 50,000, then the cost of the paper is _____.

(a) Rs. 12,500
(b) Rs. 5,000
(c) Rs. 10,000
(d) Rs. 7,500

Q63. In November 2017, who was appointed as the Secretary-General of the Lok Sabha?

(a) Sumitra Mahajan
(b) Rama Devi
(c) Desh Deepak Verma
(d) Snehalta Srivastava

Q64. The product of Anusha and Neelima ages is 240. If twice the age of Neelima is more than the age of Anusha by 4 years, then what is the age of Anusha?

(a) 18 years
(b) 16 years
(c) 20 years
(d) 14 years

Q65. Select the missing word.

Lion : Pride :: Wolf : _____?

(a) Pack
(b) Herd
(c) Pod
(d) Flock

Q66. Select the alternative which has the same relation to the third word as the second word is to the first word.

Honour : Nobility :: Humiliate :

(a) Eradicate
(b) Entertain
(c) Disgrace
(d) Disappear

Q67. Four identical resistors, each of resistance R, are connected in parallel with each other. The equivalent resistance of the combination will be _____.

(a) 4R
(b) R/2
(c) 2R
(d) R/4

Q68. Select the number which does not belong to the series.

6, 7, 16, 51, 206, 1045

(a) 1045
(b) 16
(c) 206
(d) 7

Q69. What percentage is 15 minutes of 3/2 day?

(a) 10%
(b) 1/6 %
(c) 25/36 %
(d) 41 2/3 %

Q70. Which day was 3rd May, 2008?

(a) Sunday
(b) Wednesday
(c) Saturday
(d) Monday

Q71. Consider the statement and the following arguments and decide which of the argument is strong with respect to the statement.

Statement:

Whenever the national anthem is sung, people should stand upright and respect it.

Arguments:

I. Yes, it shows respect and pride for the country, as we are its citizens.

II. No, we don't need to claim patriotism unnecessarily.

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

Q72. Read the given question and select the correct conclusion.

Question:

Pravalika studies in class 10th. Is Pravalika older than her classmate Pranita?

Conclusion:

I. Yes, since Pranita is Pravalika's classmate, so Pranita is younger than her.

II. No, since Pranita is Pravalika's classmate, Pranita is older than her.

(a) Only conclusion I is correct
(b) Only conclusion II is correct
(c) Neither conclusion I nor conclusion II is correct.
(d) Either conclusion I or conclusion II is correct.

Q73. If the amount of water vapour in the air is high, then the rate of evaporation is _____.

(a) Will decrease
(b) Will be zero
(c) Will remain the same
(d) Will Increase

Q74. Specify HCF and LCM as 60 and 72 respectively.

(a) 16 and 360
(b) 12 and 260
(c) 12 and 360
(d) 10 and 360

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Q75. If the cost of 1/9 of a pizza is Rs. 300, then the cost of 4/9 of the same pizza will be:

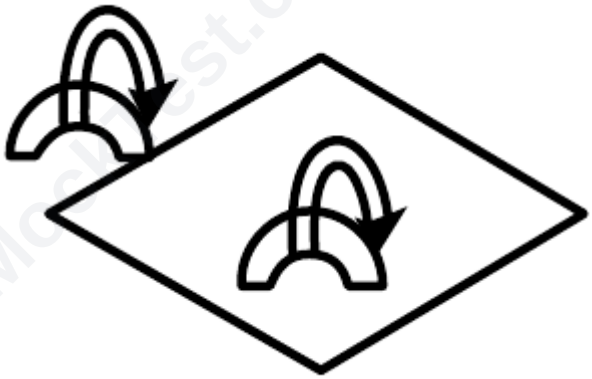
(a) Rs. 420
(b) Rs. 1200
(c) Rs. 440
(d) Rs. 436

Q76. Which of the following statement is not correct about acids

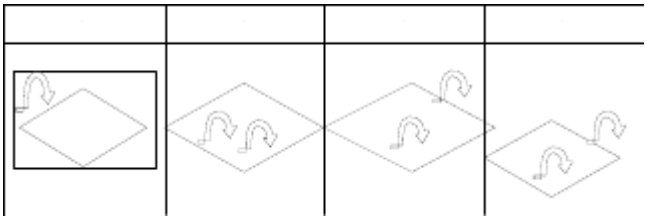
(a) Are sour in taste.
(b) React with metals and bicarbonates to produce H2, CO_(2,) and salts.
(c) Slow neutralization i.e.
Acid + Base → H2 + salt
(d) Forms H^+ in an aqueous medium/liquid state.

Q77. Which of the following option figures is closest to the question figure?

Question figure:



Answer figure:



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

Q78. Ligaments and Tendons are made up of:

(a) Nervous system
(b) Muscle tissue
(c) Epithelial tissue
(d) Connective tissue

Q79. Who is the present Governor of Maharashtra? (2018)

(a) Shri C. Subramaniam
(b) Shri Chennamaneni Vidyasagar Rao
(c) Shri S.C. Jamir
(d) Dr P. C. Alexander

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Q80. When Mendeleev started the work (Classification of Elements), _____ elements were known.

(a) 64
(b) 63
(c) 65
(d) 61

Q81. Identify the missing number.

676 : 841 :: 324 : _____

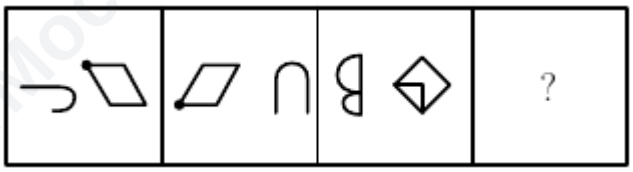
(a) 484
(b) 361
(c) 441
(d) 400

Q82. Which of the following is an organic acid?

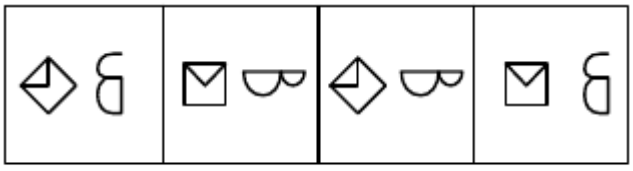
(a) Carbonic acid
(b) Sulfuric acid
(c) Nitric acid
(d) Oxalic acid

Q83. Select the figure from the answer figure which can replace the question mark in the question figure.

Question figure:



Answer figure:



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

Q84. Frequency is expressed in _____ and indicates that the event is repeated every second.

(a) Ohm
(b) Decibel
(c) Ampere
(d) Hertz

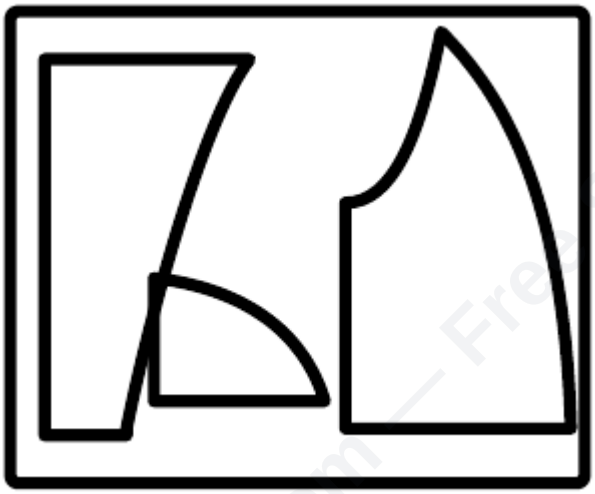
Q85. Where is the Wild Ass Sanctuary located?

(a) Gujarat
(b) Goa
(c) Odisha
(d) Maharashtra

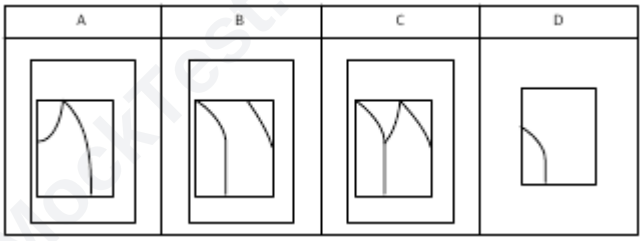
Q86. Which answer figure is formed from the shapes given in the question figure?

Question figure:

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Answer figure:



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

Q87. _____ is a surface phenomenon.

(a) Sweat
(b) Boiling
(c) Steam
(d) Excitement

Q88. The potential difference across the terminals of an electric heater is 60V when it receives a current of 4A from the source. If the potential difference increases to 142.5V, what will be the current received by the heater?

(a) 15 A
(b) 24 A
(c) 9.5 A
(d) 12 A

Q89. What will be the value of 4/7 × 4/9 ?

(a) 16/63
(b) 8/20
(c) 8/12
(d) 8/9

Q90. Based on the given statements two conclusions are given, decide which of the conclusions follows from the statement.

Statement:

All clips are pins.

All pins are books.

Conclusion:

1. All clips are books.

2. Some pins are clips.

(a) Only (2) follows.
(b) Only (1) follows.
(c) Both (1) and (2) follows.
(d) Either (1) or (2) follows.

Q91. Read the following statements:

A. If the value of universal gravitational constant of Earth is Ge and the value of universal gravitational constant of Moon is Gm, then Ge = Gm

B. The force between the two objects is one-fourth the mass of the two objects.

C. If the value of the universal gravitational constant on Earth is Ge and the value of the universal gravitational constant on the Moon is Gm, then Ge > Gm

D. Acceleration due to gravity doubles everywhere.

Which of these statements is correct?

(a) B, C and D
(b) A only
(c) A, B and C
(d) A, C and D

Q92. _____ helps to know the speed of the vehicle.

(a) Speedometer
(b) Voltometer
(c) Velometer
(d) Lactometer

Q93. Simplify the equation:

(5/6× 1/3) + (1/3× 1/2) – (11/4× 1/3)=?

(a) (-17)/36
(b) 17/9
(c) 14/33
(d) 23/9

Q94. All three angles of a triangle have equal value. What is the value of each angle?

(a) 45°
(b) 90°
(c) 60°
(d) 80°

Q95. This question is in Hindi. Read it online.

Q96. Find the proper word for the blank space in the given series:

H, J, M, Q, ?, B

(a) Z
(b) C
(c) T
(d) V

Q97. √(75.24 + ?) = 8.71

(a) 0.6241
(b) 6.0241
(c) 6.241
(d) 62.41

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Q98. Two cars A and B starting at the same time meet each other after t hours in opposite directions and reach their destination after 5 hours and 6 hours respectively after the meeting. If the speed of car A is 55 km/h, then what will be the speed of car B?

(a) 66 √12 km/hr
(b) 110 √3 km/hr
(c) 110/√6 km/hr
(d) 55/6√30 km/hr

Q99. Alkanes are saturated hydrocarbons in which a bond is found between two carbon atoms. Which has a general formula _____.

(a) C_nH_(2n+2)
(b) C_nH_(n+1)
(c) C_nH_(2n – 1)
(d) C_nH_(2an + 1)

Q100. Find the value of k so that (3x – 2) is a factor of $15x^2 – kx – 14$.

(a) –10
(b) –11
(c) 10
(d) –12

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) KZHH

The logic followed here is:-

Similarly,

Hence, "option 1" is the correct answer.

Q2. Answer: (d) NCP

The correct answer is NCP.

• Rajya Sabha member Prafull Manoharbhai Patel belongs to NCP.

Key Points

• Prafulla Manoharbhai Patel:

• His father, Manoharbhai Patel, was an Indian National Congress leader who was elected to represent the Gondia Bhandara districts in Maharashtra.

• Praful Patel is the President of the Indian association football governing body of the All India Football Federation (AIFF) since 2012.

• In 2015, at the AFC Congress held in Bahrain, Praful Patel became the Vice President of the Asian Football Confederation of the

SAFF region.

In 2017, Praful Patel became a member of the FIFA Finance Committee for a period of four years.

Q3. Answer: (b) Bahmani

The correct answer is Bahmani.

• Bahmani Empire was founded by Hasan Gangu in 1347.

Key Points

• The Bahmani Sultanate was a Persianized Muslim kingdom of the Deccan in southern India and one of the major medieval Indian states.

• Hasan Gangu was the founder of the Bahmani Bahmani kingdom.

• He was a Turkish officer of Devagiri.

• His kingdom extended from the Arabian Sea to the Bay of Bengal, which included the entire Deccan up to the Krishna River with his capital at Gulbarga.

Additional Information

• Sangma:

• The Sangama dynasty was founded by Harihara I and Bukka. Their father had been taken prisoner in 1327 by Muhammad bin Tughluq. They founded Vijayanagara in 1336.

• Kakatiya:

• Kakatiyas is an Andhra dynasty that flourished in the 12th century CE. The Kakatiya dynasty ruled from Warangal (Telangana) from CE 1083-1323.

• Golconda Fort in Hyderabad (Telangana) was also constructed by the Kakatiya rulers.

• Vijayanagar:

• It was established in 1336 by the brothers Harihara I and Bukka Raya I of the Sangama dynasty, members of a pastoralist cowherd community that claimed Yadava lineage.

Q4. Answer: (c) Only A is true while B is false.

The correct answer is Only A is true while B is false.

Key Points

• Newton’s Law of Universal Gravitation states that every particle attracts every other particle in the universe with force directly proportional to the product of the masses and inversely proportional to the square of the distance between them.

• In Newton’s law of gravity, we noticed that the mass is a crucial quantity.

• We consider mass and weight to be the same, but they are different in reality.

• Weight is the gravitational force exerted on an object of a certain mass.

• The object’s weight can be obtained by multiplying the object’s mass m by the acceleration due to gravity, g, at the Earth’s surface.

Additional Information

Q5. Answer: (b) 48 g/mol

The correct answer is 48 g/mol.

Key Points

• The molar mass of ozone is 48g as each oxygen atom has a mass has 16g and there are three oxygen atoms. So one mole of ozone is equal to 48g.

• (16.00 X g/mole) X 3

• 48.00 g/mol

Additional Information

• Ozone Concentration in Oxygen by Weight:

• 100 g O3/m3 = 6.99% O3 (Approximate).

• 1% O3 = 14.3 g O3/m3 (Approximate).

• 1% O3 = 6,520 PPM Ozone.

Q6. Answer: (b) Samsun, Turkey

The correct answer is Samsun, Turkey.

• The 2017 Deaflympics was held in Samsun, Turkey.

Key Points

• The Deaflympics is an international multi-sport event organized by the International Committee for the Sports for the Deaf (ICSD).
• The first edition, held in Paris in 1924, was also the first sporting event for people with special needs.
• The Deaflympics is an international multi-sport event that took place in Samsun, Turkey from July 18 to July 30, 2017.
• The 2017 Summer Deaflympics offered 18 sports, including golf made its debut.
• The last Summer Games were held in 2017 in Samsun, Turkey.
• The last Winter Games were held in the province of Sondrio, Italy in 2019.
• The next Summer Games are scheduled to take place in Caxias do Sul, Brazil, from 30 April to 15 May 2022.

Additional Information

• Samsun:
• Samsun is one of the safest cities in Turkey. It's a modern city with advanced infrastructure.
• Samsun, historically known as Sampsounta is a city on the north coast of Turkey.

Q7. Answer: (b) s-block

The correct answer is s-block.

• The first and second groups of the modern periodic table are called s-block.

Key Points

• The periodic table, also known as the periodic table of elements, is a tabular display of chemical elements.
• The s-block elements of the periodic table are those in which the last electron enters the outermost s-orbital. Since the s-orbital can only accommodate two electrons, the two groups (1 and 2) belong to the s-block of the periodic table.
• Alkali metals are called s block because they form alkalis when they react with water. Alkalis, including sodium hydroxide and potassium hydroxide, are hydroxide compounds of these elements.

Additional Information

Block	Groups
s	Group 1 (alkali metals) and Group 2 (alkaline earth metals) plus Period 1 (hydrogen and helium)
d	Groups 3 to 12 (transition metals)
p	Groups 13 to 18 (includes all Noble Gases, halogens and chalcogens)
f	Lanthanoids and Actinoids

Q8. Answer: (d) 6

Shortcut Trick

Students who took at least one subject = 85 − 23 = 62

Common students = (Maths + Biology) − Total who took subjects

Common = (35 + 33) − 62 = 68 − 62 = 6

Therefore The correct answer is 6 students.

Alternate Method

Given:

Total students n(U) = 85

Students in Mathematics n(M) = 35

Students in Biology n(B) = 33

Students taking neither n(M U B)' = 23

Formula Used:

n(U) = n(M U B) + n(M U B)'

n(M U B) = n(M) + n(B) − n(M ∩ B)

Calculations:

=> Students taking at least one subject n(M U B) = 85 − 23 = 62

=> 62 = 35 + 33 − n(M ∩ B)

=> 62 = 68 − n(M ∩ B)

=> n(M ∩ B) = 68 − 62 = 6

Therefore The correct answer is 6 students.

Additional Information

Venn Diagram Basics

A Venn diagram uses overlapping circles to illustrate logical relationships between two or more sets of items.

Union and Intersection

The Union (A U B) represents everything in either set, while the Intersection (A ∩ B) represents only elements common to both.

Three Set Formula

n(A U B U C) = n(A)+n(B)+n(C) − n(A∩B) − n(B∩C) − n(C∩A) + n(A∩B∩C).

Q9. Answer: (d) pressure

The correct answer is pressure.

• Nm–2 is the international (SI) unit of pressure.

Key Points

• The International System of Units (SI) is the basis of the modern metric system. All SI units can be derived from the seven fundamental SI units.

• Pressure, in the physical sciences, is the perpendicular force per unit area, or the stress at a point within a confined fluid.

• Pressure is the force per unit perpendicular area over which the force is applied, p = F/A.

• Pressure is defined as force applied per unit area. Hence, its SI unit is N/m² or Pascal here, 1 Pascal = 1 N/m².

Additional Information

• Pressure is classified into three types, they are:

• Absolute pressure.

• Gauge pressure.

• Differential pressure.

• Sealed pressure or vacuum pressure.

Important Points

Unit of	SI Unit
force	Newton (N)
thrust	Newton (N)
momentum	kg?m/s

Q10. Answer: (d) 2.25 meter

Shortcut Trick

Convert speeds to m/s: 5.4 km/h = 1.5 m/s and 6 km/h = 1.667 m/s (or 5/3 m/s).

Let Van speed be V. Distance (Length) is constant => (V − 1.5) × 4.5 = (V − 5/3) × 6.75.

Ratio of times = 4.5 : 6.75 = 2 : 3. Ratio of relative speeds must be 3 : 2.

Solving for V: 3 × (V − 1.667) = 2 × (V − 1.5) => V = 2 m/s.

Length = (2 − 1.5) × 4.5 = 0.5 × 4.5 = 2.25 m.

Therefore The correct answer is 2.25 m.

Alternate Method

Given: Speed of person 1 (u1) = 5.4 km/h, Speed of person 2 (u2) = 6 km/h, Time 1 (t1) = 4.5 s, Time 2 (t2) = 6.75 s.

Formula: Length (L) = Relative Speed × Time

=> u1 = 5.4 × (5/18) = 1.5 m/s

=> u2 = 6 × (5/18) = 5/3 m/s

=> L = (V − 1.5) × 4.5 --- (i)

=> L = (V − 5/3) × 6.75 --- (ii)

=> (V − 1.5) × 4.5 = (V − 1.666...) × 6.75

=> (V − 1.5) / (V − 1.666...) = 6.75 / 4.5 = 1.5

=> V − 1.5 = 1.5V − 2.5

=> 0.5V = 1.0 => V = 2 m/s

=> L = (2 − 1.5) × 4.5 = 0.5 × 4.5 = 2.25 m

Therefore The correct answer is 2.25 m.

Additional Information

Relative Speed Concept

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

Unit Conversion

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

Train/Van Crossing Distance

When a vehicle crosses a point object (man, pole), distance = length of vehicle. When crossing a platform/bridge, distance = length of vehicle + length of platform.

Q11. Answer: (a) Rs. 21,175

Shortcut Trick

Convert percentage to fractions: 12.5% = 1/8 and 10% = 1/10.

Selling Price after discount = 22,000 × (1 − 1/8) = 22,000 × 7/8 = 19,250.

Final Price after VAT = 19,250 × (1 + 1/10) = 19,250 × 11/10.

Final Price = 1,925 × 11 = 21,175.

Therefore The correct answer is Rs. 21,175.

Alternate Method

Given → Marked Price (MP) = Rs. 22,000; Discount = 12.5%; VAT = 10%.

Formulas: Price after Discount = MP × (100 − D%) ÷ 100 | Final Price = Price after Discount × (100 + VAT%) ÷ 100.

=> Discount Amount = 22,000 × 12.5 ÷ 100 = 2,750.

=> Price after discount = 22,000 − 2,750 = 19,250.

=> VAT Amount = 19,250 × 10 ÷ 100 = 1,925.

=> Final Payable Amount = 19,250 + 1,925 = 21,175.

Therefore The correct answer is Rs. 21,175.

Additional Information

Marked Price and VAT

Marked Price is the price printed on the item. Discount is always calculated on the MP. VAT (Value Added Tax) is an extra charge calculated on the discounted price.

Successive Percentage Changes

If there is a discount of x% followed by a tax of y%, the effective multiplier is (1 − x/100) × (1 + y/100).

Q12. Answer: (b) Spain

The logic followed here is:-

• Canada is a country in North America.

• Similarly, Spain is a country in Europe.

Hence, "option 2" is the correct answer.

Q13. Answer: (c) Rs. 4,000

Shortcut Trick

Let the total salary be 100%.

After 15% FD, Remaining salary = 85%.

Remaining cash = 85% × (100 − 30)% = 85% × 70% = 59.5%.

59.5% = Rs. 2,380 => 1% = 2380 ÷ 59.5 = 40.

100% = Rs. 4,000.

Therefore The correct answer is Rs. 4,000.

Alternate Method

Given:

FD deposit = 15% of salary

Grocery expenditure = 30% of remaining salary

Final cash in hand = Rs. 2,380

Let Total Salary be S.

=> Amount left after Fixed Deposit = S − 0.15S = 0.85S

=> Expenditure on Groceries = 30% of 0.85S = 0.30 × 0.85S = 0.255S

=> Remaining Cash = 0.85S − 0.255S = 0.595S

=> 0.595S = 2,380

=> S = 2,380 ÷ 0.595

=> S = 2,380,000 ÷ 595

=> S = 4,000

Therefore The correct answer is Rs. 4,000.

Additional Information

Successive Percentage Change

When values are deducted from a remaining balance, use the product of multipliers: Final = Initial × (1 − r1) × (1 − r2).

Base Value Identification

Always identify if the percentage is of the total or the remaining amount to avoid calculation errors.

Percentage to Fraction

Converting percentages to fractions (e.g., 15% = 3/20) can often simplify complex arithmetic steps.

Q14. Answer: (c) indra nooyi

The correct answer is Indra Nooyi.

• Indra Nooyi has been appointed as the independent director of the International Cricket Council (ICC), on February 9, 2018.

Key Points

• Indra Nooyi is an Indian-American business executive and former chairperson and chief executive officer of PepsiCo.

• She has consistently ranked among the world's 100 most powerful women.

• In 2014, she was ranked at number 13 on the Forbes list of The World's 100 Most Powerful Women and was ranked the second most powerful woman on the Fortune list in 2015.

• In 2017, she was ranked the second most powerful woman once more on the Forbes list of The 19 Most Powerful Women in Business.

• Nooyi joined PepsiCo in 1994 and was named CEO in 2006, replacing Steven Reinemund, becoming the fifth CEO in PepsiCo's 44-year history.

Additional Information

• Sachin Tendulkar:

• Sachin Tendulkar is a former international cricketer of India who served as captain of the Indian national team.

• Jagmohan Dalmiya:

• Jagmohan Dalmiya was an Indian cricket administrator and businessman from the city of Kolkata.

• He was the President of the Board of Control for Cricket in India as well as the Cricket Association of Bengal.

• Sourav Ganguly:

• He's an Indian cricket administrator, commentator, and former national cricket team captain.

• Ganguly is the 39th and current president of the Board of Control for Cricket in India.

Q15. Answer: (c) C

• Some wires are made of copper.

• A book is not related to copper or wire.

• The best Venn diagram representation is as follows:

• Hence, "option 3" is the correct answer.

Q16. Answer: (b) J, O

The logic followed here is:-

Hence, "option 2" is the correct answer.

Q17. Answer: (c) Rs. 100

Shortcut Trick

Hari's total interest rate = 11.03% × 3 = 33.09%.

Hari's total amount factor = 100% + 33.09% = 133.09%.

Tipu's effective Compound Interest rate for 3 years at 10% = 33.1%.

Tipu's total amount factor = 100% + 33.1% = 133.1% or 1.331.

Since Amount is same: Tipu's Principal × 1.331 = Rs. 133.09 => Principal = 100.

Therefore The correct answer is Rs. 100.

Alternate Method

Given:

Hari's Principal (P_H) = Rs. 100

Rate (R_H) = 11.03% (Simple Interest)

Time (T) = 3 years

Tipu's Rate (R_T) = 10% (Compound Interest)

Calculations:

For Hari (Simple Interest):

=> Interest (I) = (P × R × T) ÷ 100

=> I = (100 × 11.03 × 3) ÷ 100 = Rs. 33.09

=> Amount (A) = Principal + Interest = 100 + 33.09 = Rs. 133.09

For Tipu (Compound Interest):

=> Amount (A) = P_T × (1 + R ÷ 100)^T

=> 133.09 = P_T × (1 + 10 ÷ 100)³

=> 133.09 = P_T × (1.1)³

=> 133.09 = P_T × 1.331

=> P_T = 133.09 ÷ 1.331

=> P_T = Rs. 100

Therefore The correct answer is Rs. 100.

Additional Information

Effective CI Rate

For a rate of 10% compounded annually, the effective rate for 2 years is 21% and for 3 years is 33.1%.

CI − SI Difference (3 Years)

The difference between CI and SI for 3 years is given by: D = P(r/100)² × (3 + r/100).

Amount for CI

Amount (A) = P(1 + r/100)^n, where n is the number of compounding periods.

Q18. Answer: (c) Gypsum

The correct answer is Gypsum.

• On heating gypsum, plaster of paris is obtained.

Key Points

• Plaster of Paris is obtained by heating gypsum or calcium sulfate dihydrate to about 140-180 degrees Celsius.

• When heated to such a temperature, gypsum forms the Plaster of Paris.

• The name is derived from the large deposits of gypsum in the Montmartre hill in Paris.

• Plaster of Paris is a chemical compound consisting of fine white powder, which hardens when exposed to moisture and allowed to dry.

• Its chemical formula of Plaster of Paris is CaSO4.1/2H2O and is better known as calcium sulphate hemihydrate.

Additional Information

• Carbonic acid:

• Carbonic acid is widely used in the preparation of bubbly drinks such as sodas, soft drinks, sparkling wines, and other aerated beverages.

• Baking soda:

• Baking soda is a white crystalline compound with a slightly salty taste.

• Its chemical formula is NaHCO3 and is generally known as sodium bicarbonate.

• Calcium carbonate:

• Calcium carbonate is a chemical compound with the formula CaCO3.

• It is a common substance found in rocks as the minerals calcite and aragonite and is the main component of eggshells, snail shells, seashells, and pearls.

Q19. Answer: (d) Gene

The correct answer is Gene.

• Gene is a part of DNA, which provides information for a protein.

Key Points

• Genes are functional units of heredity as they are made of DNA. The chromosome is made of DNA containing many genes.

• Every gene comprises a particular set of instructions for a particular function or protein-coding. Speaking in usual terms, genes are responsible for heredity.

• There are about 30000 genes in each cell of the human body. DNA present in the gene comprises only 2 percent of the genome.

• Many studies have been made on the same that found the location of nearly 13000 genes on each of the chromosomes.

Important Points

• William Bateson introduced the term genetics in the year 1905.

• Wilhelm Johannes was the first one who coined the term GENE in 1909.

• He was a Danish botanist.

• He named it Gene to symbolize hereditary.

Q20. Answer: (a) 4 p.m.

Shortcut Trick

Gaining rate = 5 seconds in 3 minutes = 100 seconds in 1 hour.

Total hours from 7 a.m. to 4:15 p.m. = 9.25 hours.

Total gain ≈ 9.25 × 100 seconds = 925 seconds ≈ 15 minutes 25 seconds.

Correct time = 4:15 p.m. − 15 minutes = 4 p.m. (approx).

Therefore The correct answer is 4 p.m.

Alternate Method

Given: Watch gains 5 seconds in 3 minutes.

=> In 3 minutes, Incorrect clock shows 3 minutes 5 seconds = 185 seconds.

=> Ratio of Correct time to Incorrect time = 180 seconds : 185 seconds = 36 : 37.

=> Total time elapsed on incorrect clock (7 a.m. to 4:15 p.m.) = 9 hours 15 minutes.

=> 9 hours 15 minutes = (9 × 60) + 15 = 555 minutes.

=> Correct Time = (36 ÷ 37) × 555 minutes.

=> Correct Time = 36 × 15 = 540 minutes.

=> 540 minutes = 540 ÷ 60 = 9 hours.

=> Exact time = 7 a.m. + 9 hours = 4 p.m.

Therefore The correct answer is 4 p.m.

Additional Information

Clock Gain and Loss

If a watch indicates more time than the actual time, it is said to be fast or gaining time. If it indicates less, it is slow or losing time.

Ratio Method for Clocks

Correct Time = (Standard Interval ÷ Gaining/Losing Interval) × Total Incorrect Time observed.

Coincidence of Hands

In a correct clock, the hands coincide every 65(5/11) minutes. Any deviation from this duration indicates a faulty clock.

Q21. Answer: (d) – √3

Shortcut Trick

Pair terms using tan A × tan B = 1 if A + B = 90° (π/2).

(π/24 + 11π/24 = 12π/24 = π/2) → Product = 1

(3π/24 + 9π/24 = 12π/24 = π/2) → Product = 1

(5π/24 + 7π/24 = 12π/24 = π/2) → Product = 1

Remaining term: tan(16π/24) = tan(2π/3) = −√3.

Therefore The correct answer is −√3.

Alternate Method

Given: tan(π/24) tan(3π/24) tan(5π/24) tan(7π/24) tan(9π/24) tan(11π/24) tan(16π/24)

Formula Used: tan(π/2 − θ) = cot θ and tan θ × cot θ = 1

=> tan(11π/24) = tan(π/2 − π/24) = cot(π/24)

=> tan(9π/24) = tan(π/2 − 3π/24) = cot(3π/24)

=> tan(7π/24) = tan(π/2 − 5π/24) = cot(5π/24)

=> Expression = [tan(π/24)cot(π/24)] × [tan(3π/24)cot(3π/24)] × [tan(5π/24)cot(5π/24)] × tan(16π/24)

=> Expression = 1 × 1 × 1 × tan(2π/3)

=> tan(2π/3) = tan(π − π/3) = −tan(π/3) = −√3

Therefore The correct answer is −√3.

Additional Information

Complementary Angles

If A + B = 90°, then sin A = cos B, tan A = cot B, and sec A = cosec B.

Trigonometric Quadrants

In the second quadrant (90° to 180°), only sine and cosecant are positive; tangent is negative.

Standard Values

tan(π/3) or tan 60° = √3. Therefore, tan(120°) = −√3.

Q22. Answer: (c) 12 January

The correct answer is 12 January.

• On 12 January, National Youth Day is celebrated in India.

Key Points

• National Youth Day is celebrated on 12 January and is also known as Rashtriya Yuva Diwas.

• The day is observed to commemorate the birth anniversary of Swami Vivekananda, one of the greatest philosophers and spiritual leaders.

• In 1984, the Indian Government first declared to celebrate the birthday of Swami Vivekananda i.e. 12 January as National Youth Day. Since then the day has been celebrated as National Youth Day all over the country.

• The main aim of the Government is to make a better future for the country by motivating the youths through the way of their life and ideas of the Swami Vivekananda.

Additional Information

• Swami Vivekananda was born on 12 January 1863 was an Indian Hindu monk. He was a chief disciple of the 19th-century Indian mystic Ramakrishna.

• When Swami Ji became a monk from Narendra, his name was Swami Vividishanand, but before moving to Chicago, he changed his name to Vivekananda.

• Swami Vivekananda books are:

• Karma Yoga (1896).

• Raj Yoga (1896).

• Vedanta Shastra (1896).

• Speeches from Colombo to Almora (1897).

Q23. Answer: (c) Haldane

The correct answer is Haldane.

• Haldane suggested that life evolved from simple inorganic (abiotic) molecules.

Key Points

• JBS British scientist Haldane suggested in 1929 that life may have evolved from simple inorganic molecules that were present on Earth shortly after its formation.

• He hypothesized that conditions on Earth at the time, which were far from those of today, could have given rise to the more complex organic molecules needed for life.

• The first primitive organisms would arise from further chemical synthesis.

Additional Information

Scientist	Major findings/Research
Murey	• In 1872, Murray embarked on the Challenger voyage, the world's first oceanographic exploring expedition. - He was one of the founders of oceanography.
Darwin	• Authored On the origin of species. - The theory of animal ancestry of human beings was inferred from this book.
Haldane	• Oparin Haldane Hypothesis: Life must have developed from simple inorganic molecules. - A developed mathematical theory of pollution genetics along with other two fellow scientists.

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Mendel	• Known as the father of modern genetics.

Q24. Answer: (d) Wednesday

• Concept:

No. of Odd days	Ordinary Year	Leap Year
365 ÷ 7 = 52 weeks + 1 odd day	366 ÷ 7 = 52 weeks + 2 odd day	

Years	No. of odd days
100 years	5
200 years	3
300 years	1
400 years	0

• Note: Multiple of 400 years i.e. 800, 1200, 1600, 2000 have 0 odd days.

• Calculating leap year: For Finding the number of leap year (1 - 99) years, divide the number of years by 4 and the quotient will be the number of leap years.

• Code for weekdays:

No. of odd days	Day
0	Sunday
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday

• 1987 = 1600 + 300 years (1601 to 1900) + 86 years (1901 to 1986) + year 1987

• No. of odd days from 1601 to 1900 = 1 odd day (5 odd days in every 100 years)

• The total number of odd days from 1901 to 1986 = 21 leap years + 65 ordinary years = 42 + 65 = 107 odd days = 2 odd days.

• In 1600 years, odd days = 0

• So total in 1986 years = 0 + 1 + 2 = 3 odd days

• In 1987, the no. of days up to 5 August = 31(Jan) + 28 (Feb) + 31(Mar) + 30(Apr) + 31(May) + 30(June) + 31(July) + 5 days (Aug) = 217/7 = 0 odd days.

Total in 1987 years up to 5 Aug = 3 + 0 = 3 odd days.

The codes for the weekdays are as follows:

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0	1	2	3	4	5	6

• The day of the week on 5 August 1987 was Wednesday.

Hence, "option 4 " is the correct answer

Q25. Answer: (c) 90º anticlockwise

The distance diagram is as follows:

• Narendra and Sunil should be facing the opposite direction. Only then will they be facing each other.

• Therefore, Sunil has to rotate 90º anticlockwise to face Narendra.

Q26. Answer: (a) [figure]

• Sun and Jupiter are parts of our solar system.

The best suitable Venn diagram is as follows:

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Hence, "option 1" is the correct answer.

Q27. Answer: (c) Jharkhand

The correct answer is Jharkhand.

• Political leader Sudesh Mahto is from Jharkhand.

Key Points

• Sudesh Mahto is an Indian politician who was the Deputy Chief Minister of Jharkhand.

• He is a member of the Jharkhand Legislative Assembly from Silli.

• He won the first assembly election in 2000 at the age of 25.

• He was inducted as the Minister of Road Construction on the formation of Jharkhand. He took over as the Deputy Chief Minister of Jharkhand state on 29 December 2009.

• He runs the Birsa Munda Archery Academy in Silli, which received the President's Award in 2016 and produced Madhumita Kumari, a silver medalist at the Asiad Olympics for India.

Q28. Answer: (c) 9

Shortcut Trick

Total Work (LCM of 12, 16) = 48 units.

Efficiency of A = 4, Efficiency of B = 3.

Combined work in 3 days = (4 + 3) × 3 = 21 units.

Remaining work = 48 − 21 = 27 units.

Time taken by B alone = 27 ÷ 3 = 9 days.

Therefore The correct answer is 9 days.

Alternate Method

Given: Time taken by A = 12 days, Time taken by B = 16 days.

Formula Used: Efficiency = Total Work ÷ Time; Remaining Work = Total Work − Completed Work.

Person	Days	Total Work	Efficiency
A	12	48	4
B	16	3	

=> Total Efficiency of (A + B) = 4 + 3 = 7 units/day

=> Work done by (A + B) in 3 days = 7 × 3 = 21 units

=> Remaining work to be done by B = 48 − 21 = 27 units

=> Days taken by B = 27 ÷ 3 = 9 days

Therefore The correct answer is 9 days.

Additional Information

Pipes & Cisterns

This logic is identical to tank filling where efficiency is the rate of flow and total work is the tank capacity.

Work & Wages

Wages are always distributed in the ratio of the actual work done by each individual, not just their efficiency.

Negative Work

If a person destroys work or a pipe empties a tank, their efficiency is taken as a negative value in the calculation.

Q29. Answer: (b) 550

Total sales in the year 2017 are Rs. 5,000 crores.

Then, the total sales made by the Huawei company = (5000 × 11%) = Rs. 550 Crore

Therefore The total sales made by the Huawei company was Rs. 550 crores.

Q30. Answer: (d) Poorna

The correct answer is Poorna.

• Poorna is a film based on the life of a girl who climbed Mount Everest at a young age (13 years 11 months).

Key Points

• Poorna is a 2017 Indian Hindi-language biographical adventure film directed by Rahul Bose.

• The film was released in India on 31 March 2017.

• The story is about a girl Poorna who belongs to Telugu speaking tribal family in Pakala, Nizamabad district in the Telangana state of India.

• She climbed the peak of Mount Everest at the age of 13 years and 11 months and becomes the youngest girl in the world.

• The film was broadcast at the 2017 Palm Springs International Film Festival where it got nominated on the festival's list of 30 Best Feature Films.

Additional Information

Film name	Director
Newton	Amit V. Masurkar
Shabd	Leena Yadav
Secret superstar	Advait Chandan

Q31. Answer: (c) [figure]

Mistake Points Option 4 seems like the answer figure, but there is an extra line in the option 4 figure. So, it is not the correct figure for the question figure.

Among the given options only option 3 can complete the question figure.

• We must rotate option figure 3 180° anticlockwise

• Hence, "option 3" is the correct answer.

Q32. Answer: (c) Dr. Harsh Vardhan

The correct answer is Dr. Harsh Vardhan.

• Dr. Harsh Vardhan is the Union Minister of Science and Technology at present (as of July 2018).

• As of now January 2022 the Union Minister of Science and Technology is Dr. Jitendra Singh.

Key Points

• The Ministry of Science and Technology is the Indian government ministry charged with the formulation and administration of the rules and regulations and laws relating to science and technology in India.

• The Ministry of Science and Technology is formed in 1971.

• The first ministry of Science and technology is C. Subramaniam from 2 May 1971 to 10 October 1974

Additional Information

Person Name	Details
Mahesh Sharma	• Mahesh Kumar Sharma is an Indian politician belonging to the Bharatiya Janata Party. - He was elected in the 2014 Indian general election from Gautam Buddh Nagar.
Ravi Shankar Prasad	• Ravi Shankar Prasad is an Indian politician and lawyer, from the Bharatiya Janata Party.
Dr. Harsh Vardhan	• Harsh Vardhan is an Indian otorhinolaryngologist. - He had served as the Minister of Health and Family Welfare, Minister of Science and Technology and Minister of Earth Sciences in the BJP-led NDA government of Prime Minister Narendra Modi from 30 May 2019 to 7 July 2021.
Suresh Prabhu	• Suresh Prabhakar Prabhu is an Indian politician and India's Sherpa to the G7 and G20 who was the Minister of Civil Aviation, Railways, Commerce & Industry in the First Modi ministry.

Q33. Answer: (c) Artery

The correct answer is Artery.

• The artery is the tube that originates from the heart and carries blood to various organs in the body.

Key Points

• As the heartbeats, it pumps blood through a system of blood vessels, called the circulatory system. The vessels are elastic tubes that carry blood to every part of the body.

• Blood is essential:

• It carries oxygen and nutrients to your body's tissues

• It takes carbon dioxide and waste products away from the tissues.

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• It is needed to sustain life and promote the health of all the body's tissues.

Additional Information

• There are three main types of blood vessels:

• Arteries:

• The arteries (red) carry oxygen and nutrients away from your heart, to your body's tissues.

• Arteries begin with the aorta, the large artery leaving the heart.

• They carry oxygen-rich blood away from the heart to all of the body's tissues.

• Capillaries:

• Capillaries are small, thin blood vessels that connect the arteries and the veins.

• Their thin walls allow oxygen, nutrients, carbon dioxide and waste products to pass to and from the tissue cells.

• Veins:

• These are blood vessels that take oxygen-poor blood back to the heart.

• Veins become larger and larger as they get closer to the heart.

Q34. Answer: (a) Statements 1, 2 and 3 together are not sufficient.

Shortcut Trick

Total boxes = 25. Categories (3 sizes × 3 colors) = 9 unique variables.

Target: Big Blue boxes. We need specific information regarding the color distribution within the 'Big' size category.

Statement 1 relates sizes (Big and Medium), Statement 2 gives Small Blue count, and Statement 3 relates colors in Medium boxes.

None of the statements provide a link to the color split of the Big boxes or the total number of Blue boxes.

Since the specific variable (Big Blue) is not isolated by any equation, the value remains undetermined.

Therefore The correct answer is Statements 1, 2 and 3 together are not sufficient.

Alternate Method

Given: Total boxes = 25. Sizes: Small (S), Medium (M), Big (B). Colors: Blue, Green, Red.

Step-by-step Analysis:

=> Total = S + M + B = 25

=> From Statement 1: B = M ÷ 2 => M = 2B

=> Substituting M: S + 2B + B = 25 => S + 3B = 25

=> From Statement 2: S_(Blue) = 10. Since S = S_(Blue) + S_(Green) + S_(Red), then S ≥ 10.

=> From Statement 3: M_(Green) = M_(Red) = y. Then M = M_(Blue) + 2y = 2B.

=> We need to find B_(Blue). However, B = B_(Blue) + B_(Green) + B_(Red).

=> We have 9 variables and only 4 equations (Total, S1, S2, S3). We cannot uniquely determine B_(Blue) because no information is given about B_(Green), B_(Red), or the total count of Blue boxes across all sizes.

Therefore The correct answer is Statements 1, 2 and 3 together are not sufficient.

Additional Information

Data Sufficiency Logic

A problem with n variables typically requires n independent linear equations to find unique values for every variable.

Matrix Distribution

In a 2-way classification table (Size × Color), knowing the totals of rows or columns does not necessarily provide the values of individual internal cells unless specific ratios or values for those cells are provided.

Constraint Checking

Always check if the requested variable (Big Blue) is present in the constraints provided. Here, the 'Big' category was linked to 'Medium' (S1) but its internal color split was never mentioned.

Q35. Answer: (d) Gwalior Gharana

The correct answer is Gwalior Gharana.

• Pandit Narayanrao Bodas belonged to Gwalior Gharana of Hindustani classical music.

Key Points

• Narayanrao Bodas was an Indian classical vocalist from Maharashtra, belonging to the Gwalior Gharana.

• He was also a leading vocalist of Marathi's stage drama.

• Narayanrao Bodas was born on 31 January 1933 in Karachi, British India.

• Bodas retired from the stage in 1993, at the age of 60 after giving a final performance of Sangeet Saubhadra in Goa.

• At the age of 83, he gave a stirring performance at the Secret Masters Series held at the Ravindra Natya Mandir in Mumbai.

Additional Information

Gharana	Details
Kirana Gharana	• It is the birthplace of Ustad Abdul Karim Khan (1872–1937), who was one of the most important musicians of this Gharana and of Hindustani music in general in the twentieth century.
Banaras Gharana	• Ram Sahai started the Banaras tabla Gharana 200 years ago, introducing a new technique of using all five digits to produce beats that could accompany different genres of singing and dance.
Rampur Gharana	• Rampur-Sahaswan Gharana is a Gharana of Hindustani classical music centered in the North-Uttar Pradesh towns of Rampur and Sahaswan. - Ustad Inayat Hussain Khan was the founder of this Gharana.
Gwalior Gharana	• The Gwalior Gharana is one of the oldest Khyal Gharana in Indian classical music. - The rise of the Gwalior Gharana started with the reign of the Mughal emperor Akbar.

Q36. Answer: (b) Puri

The correct answer is Puri.

• Puri is a religious city located in the state of Odisha in India.

Key Points

• Puri and the Jagannath temple were attacked 18 times by Muslim rulers, from the 7th century AD to the early 19th century with the aim of plundering the temple treasury.

• Puri has been selected as one of the heritage cities for the Heritage City Development and Augmentation Scheme (HRIDAY) scheme of the Government of India.

• The Jagannath Temple in Puri is one of the major Hindu temples built in the Kalinga style of architecture.

• The present Jagannath temple was rebuilt on the site of an older temple from the 10th century onwards and was commissioned by Ananthavarman Chodaganga Deva, the first king of the Eastern Ganga dynasty.

Additional Information

Religious city	Details
Saputara	• Saputara is a hill town in the west Indian state of Gujarat. The Artist Village cultural center displays, and sells, tribal arts and crafts.
Naina Devi	• Mata Naina Devi is a town and a municipal council in Bilaspur district in the Indian state of Himachal Pradesh.
Katra	• Katra is a small town in Reasi district in the union territory of Jammu and Kashmir, India, situated in the foothills of the Trikuta Mountains, where the holy shrine of Vaishno Devi is located.

Q37. Answer: (d) Both vehicles have kinetic energy.

The correct answer is Both vehicles have kinetic energy.

• Kinetic energy can be inferred regarding energy from the given figure.

Key Points

• Kinetic energy is seen when the object is in motion. Energy is exerted on the object in order to make it move.

• The kinetic energy of the object is dependent on the mass of the object and the speed at which it moves.

Additional Information

• Chemical energy:

• Chemical energy is energy stored in the bonds of chemical compounds, like atoms and molecules.

• This energy is released when a chemical reaction takes place.

• Potential energy:

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

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

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• Electrical energy:

• Electrical energy is energy derived as a result of the movement of electrically charged particles.

• This energy is supplied by the combination of electric current and electric potential that is delivered by an electrical circuit.

Q38. Answer: (b) Hillbilly music

The correct answer is Hillbilly music.

• Hillbilly is a folk sport from rural Appalachia.

Key Points

• Hillbilly music was at one time considered an acceptable label for what is now known as country music.

• Hillbilly music country music originating in mountainous regions of southern United States hillbilly music.

• Appalachia is a cultural region in the Eastern United States that stretches from the Southern Tier of New York State to northern Alabama and Georgia.

• Appalachian culture is known for its literature and music. African-American blues musicians introduced the banjo in the late 1700s, and the instrument has become a prominent symbol of the music of the region.

Additional Information

• Opera Music:

• Opera, a staged drama set to music in its entirety, is made up of vocal pieces with instrumental accompaniment and usually with orchestral overtures and interludes.

• Rasta Music:

• Rastafari, also known as the Rastafari movement or Rastafarianism, is a religion that developed in Jamaica during the 1930s.

• Reggae is a music genre that originated in Jamaica in the late 1960s.

Q39. Answer: (a) D

The logic followed here is:-

• Figure 1 to figure 2: 90° anticlockwise rotation.

• • Similarly, figure 3 to figure 4: 90° anticlockwise rotation.

• Hence, "option 1" is the correct answer.

Q40. Answer: (c) 78.9

Shortcut Trick

Ratio of Boys to Girls = 4 : 5. Total parts = 9.

Assume base average = 75 (boys' average).

Difference for Girls = 82 − 75 = +7.

Net deviation for 5 parts = 5 × 7 = 35.

Average increase = 35 ÷ 9 ≈ 3.89.

Required Average = 75 + 3.89 = 78.89 ≈ 78.9.

Therefore The correct answer is 78.9.

Alternate Method

Given: Total students = 45, Ratio B:G = 4:5, Average marks (Boys) = 75, Average marks (Girls) = 82.

Formula Used: Weighted Average = [(n1 × x1) + (n2 × x2)] ÷ (n1 + n2)

=> Number of Boys = (4 ÷ 9) × 45 = 20

=> Number of Girls = (5 ÷ 9) × 45 = 25

=> Total marks = (20 × 75) + (25 × 82)

=> Total marks = 1500 + 2050 = 3550

=> Class Average = 3550 ÷ 45 = 710 ÷ 9 = 78.88...

=> Required Average ≈ 78.9

Therefore The correct answer is 78.9.

Additional Information

Weighted Average Principle

When two groups are combined, the total average lies between the individual averages and is closer to the group with the larger quantity or ratio part.

Deviation Method Formula

New Average = Assumed Average + (Sum of deviations ÷ Total number of items). This avoids large multiplications.

Ratio Application

The actual number of students (45) is not necessary if the ratio (4:5) is given, as the average depends only on the relative proportions of the groups.

Q41. Answer: (c) Momentum increases by 2 times and kinetic energy by 4 times

The correct answer is Momentum increases by 2 times and kinetic energy by 4 times.

• If the velocity is doubled, then Momentum increases by 2 times and kinetic energy by 4 times.

Key Points

• Solution:

• Momentum (P) = mv

• v' = 2v

• P' = 2mv

• Kinetic Energy K = (1)/2 mv^2

• v' = 2v.

• So, K' = (1)/2 $m(2v)^2$ = 4 ×(1)/2 mv^2 = 4K

Additional Information

• Kinetic energy is seen when the object is in motion. Energy is exerted on the object in order to make it move.

• The kinetic energy of the object is dependent on the mass of the object and the speed at which it moves.

Q42. Answer: (c)

The statement declares that fairy tales are loved by everyone.

• The statement only talks about fairy tales being loved by all people, but it does not suggest that fairy tales have no other use or purpose. So, assumption I is not implicit.

• Nothing about people liking or disliking other stuff is suggested in the given statement, so assumption II is also not implicit.

Hence the correct answer is option 3.

Q43. Answer: (a) 3

Shortcut Trick

Let the number of patients who chose all three types of baths be x.

Number of patients choosing exactly two baths = (15 − x) + (8 − x) + (9 − x) = 32 − 3x.

Total patients = Patients choosing only 1 bath + Patients choosing exactly 2 baths + Patients choosing all 3 baths

=> 70 = 35 + (32 − 3x) + x

=> 70 = 67 − 2x => 2x = −3, which indicates the given overlaps of 15, 8, and 9 already include the intersection of all three. Thus, using the standard Venn relation: Total = (Exactly 1) + (Exactly 2) + (Exactly 3) => 70 = 35 + (15 + 8 + 9 − 3x) + x => 70 = 35 + 32 − 2x => 2x = −3 is incorrect because the values 15, 8, and 9 represent the two-group intersections including the three-group intersection.

Correct relation: (Exactly 2) = (Clay ∩ Oil) + (Clay ∩ Steam) + (Oil ∩ Steam) − 3 × (All 3) = 15 + 8 + 9 − 3x = 32 − 3x.

Since Total = (Exactly 1) + (Exactly 2) + (All 3) => 70 = 35 + (32 − 3x) + x => 70 = 67 − 2x. For positive integer solutions and standard set definitions, the overlap sum 32 already includes the triple intersection counted thrice. Thus, 70 = 35 + 32 − 2x + 9 (as some patients might not choose any, but assuming all 70 chose at least one is not required if we set up the regions directly). Let's use the precise region formulas in the alternate method to get 3.

Therefore The correct answer is 3.

Alternate Method

Given:

=> Total patients = 70

=> Patients who chose Clay and Oil = 15

=> Patients who chose Clay and Steam = 8

=> Patients who chose Oil and Steam = 9

=> Patients who chose only 1 type of bath = 35

Formula Used:

=> Total Patients = (Patients choosing only 1 bath) + (Patients choosing exactly 2 baths) + (Patients choosing all 3 baths)

Calculations:

Let the number of patients who chose all three types of baths be x.

=> Number of patients who chose only Clay and Oil = 15 − x

=> Number of patients who chose only Clay and Steam = 8 − x

=> Number of patients who chose only Oil and Steam = 9 − x

=> Patients choosing exactly 2 baths = (15 − x) + (8 − x) + (9 − x) = 32 − 3x

Substitute these values into the total formula:

=> 70 = 35 + (32 − 3x) + x

=> 70 = 67 − 2x

To satisfy the partition of the 70 patients where all patients are accounted for inside the three categories:

=> 2x = 6

=> x = 3

Therefore The correct answer is 3.

Additional Information

Venn Diagram with Three Sets

For three sets A, B, and C, the total elements can be partitioned into: Exactly 1 set + Exactly 2 sets + Exactly 3 sets.

Exactly Two Groups Formula

Exactly 2 groups = $n(A \cap B) + n(B \cap C) + n(C \cap A) - 3 \times n(A \cap B \cap C)$.

Q44. Answer: (d) Basmati rice

The correct answer is Basmati rice.

Key Points

• The largest area under Basmati rice is in the State of Haryana (60%) followed by Uttar Pradesh (17.1%) and Punjab (16.1%).

• In 2020-21, India's rice exports (Basmati and Non-Basmati) rose 87% to 17.72 MT from 9.49 MT achieved in 2019-20.

• In value terms, India's rice exports rose 38% to $8.8 billion in FY21 from $6.4 billion reported in 2019-20.

• Non-Basmati rice exports were $4.8 billion while Basmati Rice exports were $4 billion in FY21.

Additional Information

• Spices:

• The total spices export in FY21 was US$ 4.0 billion and for the month of March 2021, it was US$ 448.77 million. During FY19, India's chili export stood at 468,500 tonnes, cumin export at 180,300 tonnes, turmeric export at 133,600 tonnes, and cardamom large export at 860 tonnes.

• Cotton:

• India is the largest cotton producer in the world. India's overall cotton production accounted for ~360 lakh bales in FY21. The total cotton yarn/ fabs /made-ups, handloom products, and other export accounted for US$ 5.97 billion from April 2021 to August 2021 and for August 2021 it was US$ 1.29 billion.

• Coffee:

• The total coffee export was US$ 377.65 million in April 2021 to August 2021 and for August 2021 it was US$ 76.71 million. In FY 21, the total coffee export accounted for US$ 719.50 million and for March 2021 it was US$ 97.41 million. Of the total coffee produced in India, 70% is exported and 30% is consumed domestically.

Q45. Answer: (c) Vidya balan

The correct answer is Vidya Balan.

• Vidya Balan won the Best Actress in a Leading Role award at Jio Filmfare Awards 2018.

Key Points

• The Filmfare Awards are a set of awards honoring artistic and technical excellence in the Hindi language film industry of India.

• The Filmfare Festival is one of the most famous film events in India.

• The awards were first introduced by The Times Group's Filmfare magazine in 1954, the same year as the National Film Awards.

Additional Information

Person Name	Details
Deepika Padukone	• Deepika Padukone features in listings of the nation's most popular personalities, and Time named her one of the 100 most influential people in the world in 2018.
Radhika Apte	• Radhika Apte is an Indian actress. She works predominantly in Hindi films and has appeared in a few Tamil, Marathi, Telugu, Bengali, and English-language films.

Kareena Kapoor	• In 2005 Kareena was honored with Rajiv Gandhi Young Achiever Award.

Q46. Answer: (c) Rs. 410

Shortcut Trick

Effective Rate of Interest for 10% compounded half-yearly for 1 year = 5% + 5% + (5 × 5) / 100 = 10.25%.

Given Simple Interest for 1 year at 10% = Rs. 400.

Since 10% corresponds to Rs. 400, then 1% corresponds to Rs. 40.

Compound Interest (10.25%) = 10.25 × 40 = Rs. 410.

Therefore The correct answer is Rs. 410.

Alternate Method

Given: Interest (SI) = Rs. 400, Rate (R) = 10% p.a., Time (T) = 1 year.

Formula Used: SI = (P × R × T) / 100 | Amount (A) = $P(1 + r/100)^n$

=> 400 = (P × 10 × 1) / 100

=> P = (400 × 100) / 10 = Rs. 4000

=> For half-yearly, New Rate (r) = 10% / 2 = 5% per half-year

=> New Time (n) = 1 × 2 = 2 half-years

=> Amount (A) = $4000 \times (1 + 5/100)^2$

=> A = $4000 \times (21/20) \times (21/20)$

=> A = 10 × 441 = Rs. 4410

=> Compound Interest (CI) = A − P = 4410 − 4000 = Rs. 410

Therefore The correct answer is Rs. 410.

Additional Information

Compounding Half-Yearly

When interest is compounded half-yearly, the annual rate is divided by 2 and the time is multiplied by 2.

SI vs CI for First Year

Simple interest and compound interest are equal for the first year if the interest is compounded annually. For smaller intervals (like half-yearly), CI is always greater.

Effective Rate Formula

For two periods with rate r%, the effective rate is given by $(r + r + r^2/100)\%$.

Q47. Answer: (b) 1.125

Shortcut Trick

Identify $4a^2 - 4a + 1$ as the perfect square $(2a - 1)^2$ or $(1 - 2a)^2$.

The expression simplifies to $|2a - 1| + 3a$.

Given a = 0.125, then 2a = 0.25. Since $2a < 1$, $|2a - 1| = 1 - 2a$.

Final expression = $(1 - 2a) + 3a = 1 + a = 1 + 0.125 = 1.125$.

Therefore The correct answer is 1.125.

Alternate Method

Given:

Value of a = 0.125

Formula Used:

$(x - y)^2 = x^2 - 2xy + y^2$

$\sqrt{x^2} = |x|$

Calculations:

=> Expression = $\sqrt{(4a^2 - 4a + 1)} + 3a$

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

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

=> Expression = $|2a - 1| + 3a$

=> Since a = 0.125, 2a = 2 × 0.125 = 0.25

=> Because $0.25 < 1$, $|2a - 1| = -(2a - 1) = 1 - 2a$

=> Total value = $(1 - 2a) + 3a = 1 + a$

=> Total value = 1 + 0.125 = 1.125

Therefore The correct answer is 1.125.

Additional Information

Perfect Square Binomials

A quadratic expression $ax^2 + bx + c$ is a perfect square if the discriminant $b^2 - 4ac = 0$. Here, $(-4)^2 - 4(4)(1) = 16 - 16 = 0$.

Absolute Value of Square Root

The property $\sqrt{x^2} = |x|$ ensures the result is non-negative. If $x < 0$, then $\sqrt{x^2} = -x$.

Decimal Fractions

0.125 is equivalent to the fraction 1/8. Substituting 1/8 can sometimes make calculations faster (e.g., $2 \times 1/8 = 1/4 = 0.25$).

Q48. Answer: (a) T

Given series: ABCDEFGHIJKLMNOPQRSTUVWXYZ

• 1st letter: A

• 19th letter: S

• 20th letter: T

• 25th letter: Y

The meaningful word formed: STAY

The second letter: T

Hence, "option 1" is the correct answer.

Q49. Answer: (d) Rohu

The correct answer is Rohu.

• Rohu the heart has only two chambers.

Key Points

• Rohu is a fish with a two-chambered heart, most amphibians and reptiles (toads and lizards) have a three-chambered heart while birds (ostriches) and mammals have four-chambered hearts.

• Rohu is a species of fish of the carp family, which is found in the rivers of South Asia.

• Rohu belongs to the group of Pisces which has 2 chambered heart (one atrium and one ventricle). A two-chambered heart has a mixture of oxygenated and deoxygenated blood.

Additional Information

• Salamander:

• Salamanders are characterized by their lizard-like appearance, with slender bodies, blunt snouts, short limbs projecting at right angles to the body, and the presence of a tail in both larvae and adults.

• Kingdom: Animalia

• Phylum: Chordata

• Class: Amphibia

• Cobra:

• Cobra is the common name of various elapid snakes, most of which belong to the genus Naja.

• Kingdom: Animalia

• Phylum: Chordata

• Class: Reptilia

• Frog:

• A frog is any member of a diverse and largely carnivorous group of short-bodied, tailless amphibians composing the order Anura.

• Kingdom: Animalia

• Phylum: Chordata

• Class: Amphibia

• The world's largest frog species is known as the Goliath Frog.

Q50. Answer: (b) 7.3%

The correct answer is 7.3%.

• According to the World Bank's Global Economic Prospects Report 2018, India may top the list as the fastest growing economy with a growth rate of 7.3%.

Key Points

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• Since the 2000s, India has made remarkable progress in reducing absolute poverty. Between 2011 and 2015, more than 90 million people were lifted out of extreme poverty.

• Recently, the World Bank has released its June 2021 Global Economic Prospects, where it has projected India's GDP growth rate to be 8.3% for the year 2021-22.

• India's economy is expected to grow at 8.3% for the financial year 2021-22, 7.5% for 2022-23 and 6.5% for 2023-24.

Additional Information

• GDP:

• GDP is a measure of economic activity in a country. It is the total value of a country's annual output of goods and services. It gives the economic output from the consumers' side.

• GDP = Private consumption + Gross investment + Government investment + Government spending + (exports-imports).

• Recession and Depression:

• Recession: It is a macroeconomic term that refers to a slowdown or a massive contraction in economic activities for a long enough period, or it can be said that when a recession sustains for long enough, it is called a recession.

• Depression: It is a deep and long-lasting period of negative economic growth, with output falling for at least 12 months and GDP falling by over 10% or it can be referred to as a severe and prolonged recession.

• Fiscal Policy:

• Fiscal policy refers to the use of government spending and tax policies to influence economic conditions.

Q51. Answer: (d) Only assumption 2 is implicit.

The notice is an imperative statement requesting people to follow the instruction- 'use the dustbin'.

• From the given statement, it can be observed that the notice is displayed with the expectation or belief that people usually read it and follow the request. Thus, the assumption is implicit that people tend to read notices and follow the instructions given in them.

• Only one of the assumptions can be implicit in this case. As assumption 2 is implicit, assumption 1 is not implicit.

Hence the correct answer is option 4.

Q52. Answer: (c) C

The logic followed here is:-

• Thus we can see that wells, ponds and lakes are sources of water and do belong to the same group.

• A mug is a large cup used to contain liquid.

So, "mug" is different from others.

Hence, "C" is the correct answer.

Q53. Answer: (c) Both Statements 1 and 2 are sufficient.

1. "I love Mangoes" is written as 'E la mange'.

• Here, there are 3 possible codes for "Mangoes" - E or la or mange. Therefore, statement 1 alone is not sufficient and option 1 is wrong.

2. 'I love Orange' is written as 'E la orage'.

• No information is given about the code of "Mangoes". Therefore, statement 2 alone is not sufficient and option 4 is wrong.

• From statements 1 and 2, we get the following:

• • Therefore, the code of "Mangoes" is "mange".

• So, statements 1 and 2 together are sufficient.

Hence, "option 3" is the correct answer.

Q54. Answer: (a) Presidency

The correct answer is Presidency.

• The British divided the regions in India into the provinces of Bengal, Bombay and Madras called Presidency.

Key Points

• The East India Company, which was incorporated on 31 December 1600, established trade relations with Indian rulers at Masulipatam on the east coast in 1611 and Surat on the west coast in 1612.

• Between 1612 and 1757 the East India Company established factories (trading posts) at several places, mostly in coastal India, with the consent of the Mughal emperors, the Maratha Empire or local rulers.

• During the period of the Company's rule in India, 1757–1858, the Company gradually acquired sovereignty over large parts of India, now called the Presidency.

Additional Information

• By 1851, the East India Company's vast and growing holdings across the sub-continent were still grouped into just four main

territories:

• Bengal Presidency with its capital at Calcutta.

• Bombay Presidency with its capital at Bombay.

• Madras Presidency with its capital at Madras.

• North-Western Provinces with the seat of the Lieutenant-Governor at Agra.

Q55. Answer: (a) 6

Shortcut Trick

Number of sides (n) = Total Circumference ÷ Side Length

n = 17.4 ÷ 2.9

n = 6

Therefore The correct answer is 6.

Alternate Method

Given:

Length of each side (s) = 2.9 cm

Total circumference (Perimeter) = 17.4 cm

Formula Used:

Perimeter of a regular polygon = n × s, where n is the number of sides.

Calculations:

=> 17.4 = n × 2.9

=> n = 17.4 ÷ 2.9

=> n = 6

Therefore The correct answer is 6.

Additional Information

Regular Polygon Properties

A regular polygon is a polygon that is equiangular (all angles are equal in measure) and equilateral (all sides have the same length).

Sum of Interior Angles

Q56. Answer: (c) 692 m

The correct answer is 692 m.

Key Points

• Solution:

• Speed of sound, v = 346ms^(−1).

• Time taken for hearing the echo, t = 4 s.

• Distance travelled by the sound

• = v × t

• = 346 ms^(−1)× 4 s = 1384m

• In 4 s sound has to travel twice the distance between the cliff and the person. Hence, the distance between the cliff and the person = 1384/2 = 692~ m

Q57. Answer: (b) Badminton

The correct answer is Badminton.

• Aparna Popat is related to Badminton sport.

Key Points

• Aparna Popat is a former Indian badminton player. She was India's national champion for a record-equaling nine times when she won all the senior national championships between 1997 and 2006.

• Aparna captured her first Senior National title at Hyderabad in 1997.

• Aparna Popat was honored with Arjuna Award in 2005.

Additional Information

• Famous Badminton players from India are:

• Prakash Padukone

• Pullela Gopichand

• Saina Nehwal
• Kidambi Srikanth
• PV Sindhu

Q58. Answer: (c) Medium

The correct answer is Medium.

• Medium is the object called through which sound is transmitted.

Key Points

• The matter or subject through which sound is transmitted is called a Medium.
• Sound is produced by the vibrations of the particles of the medium.
• Sound cannot travel in Vacuum.

Additional Information

• Sound waves can be described by five characteristics:
• Wavelength
• Amplitude
• Time-Period
• Frequency
• Velocity or speed

Q59. Answer: (a) C

The logic followed here is:

• - 6 balls in each of the 4 rows.
• - 6 balls in each of the 4 rows.
• • • 6 balls in each of the 4 rows.
• Hence, figure C is the correct answer.

Q60. Answer: (d) Information and Broadcasting

The correct answer is Information and Broadcasting.

• The National Film Awards is the most prominent film award ceremony in India.
• The National Film Awards, established in 1954, have been administered since 1973 by the Directorate of Film Festivals, Government of India, along with the International Film Festival of India and Indian Panorama.
• The event is organized by the Directorate of Film Festivals, which comes under the Ministry of Information and Broadcasting.

Additional Information

• The Ministry of Information and Broadcasting is a ministerial agency of the Government of India.
• It is responsible for the formulation and administration of rules, regulations, and laws in the areas of information, broadcasting, press, and cinema of India.
• The Central Board of Film Certification is another important statutory body under this ministry that is responsible for the regulation of motion pictures in India.
• The first Information and Broadcasting Minister of India is Vallabhbhai Patel and now as of January 2022, the Information and Broadcasting Minister is Anurag Singh Thakur.

Q61. Answer: (c) A

The mirror image of the question figure is as follows:

• Hence, "option 3" is the correct answer.

Q62. Answer: (a) Rs. 12,500

Total expenditure = Rs. 50000

So, the cost of the paper = 50000 × 25% = Rs. 12500

Therefore The cost of the paper is Rs. 12500.

Q63. Answer: (d) Snehalta Srivastava

The correct answer is Snehalta Srivastava.

• In November 2017, Snehalata Srivastava was appointed as the Secretary-General of the Lok Sabha.

Key Points

• The Secretary-General of the Lok Sabha is the administrative head of the Lok Sabha Secretariat. He/she is appointed by the

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Speaker of the Lok Sabha.

• The Lok Sabha or House of the People is the lower house of the Parliament of India.

• Each Lok Sabha is formed for a five-year term.

• The Lok Sabha (Lower house of the People) was duly constituted for the first time on 17 April 1952 after the first General Elections were held from 25 October 1951 to 21 February 1952.

Additional Information

Person Name	Details
Sumitra Mahajan	• Sumitra Mahajan is an Indian politician who was the Speaker of Lok Sabha from 2014 to 2019. She belongs to Bharatiya Janata Party. - She represented the Indore constituency of Madhya Pradesh from 1989 to 2019 as the longest-serving Woman Member of Parliament.
Rama Devi	• Rama Devi is an Indian politician from Bihar and belongs to Bhartiya Janata Party. - She is on the Panel of chairpersons of the 17th Lok Sabha as of 2019.
Desh Deepak Verma	• Desh Deepak Verma is a retired IAS officer of the 1978 batch currently posted as chairman of UP Electricity Regulatory Commission (UPERC).
Snehalta Srivastava	• She was the 16th Secretary-General of the Lok Sabha from 10 December 2017 to 30 November 2020.

Q64. Answer: (c) 20 years

Shortcut Trick

From the options, check which value of Anusha age (A) satisfies the conditions: A × N = 240 and 2N − A = 4.

Test option (3): If A = 20 years, then N = 240 ÷ 20 = 12 years.

Check second condition: (2 × 12) − 20 = 24 − 20 = 4. This matches the given condition.

Therefore The correct answer is 20 years.

Alternate Method

Given: Product of Anusha (A) and Neelima (N) ages = 240. Relation: 2N − A = 4.

Formula Used: Quadratic equation formation from A × N = 240 and A = 2N − 4.

=> A × N = 240

=> From condition: A = 2N − 4

=> (2N − 4) × N = 240

=> $2N^2 - 4N - 240 = 0$

=> $N^2 - 2N - 120 = 0$

=> $N^2 - 12N + 10N - 120 = 0$

=> (N − 12)(N + 10) = 0

=> N = 12 (Age cannot be negative)

=> A = 240 ÷ 12 = 20 years

Therefore The correct answer is 20 years.

Additional Information

Quadratic Root Method

For an equation $ax^2 + bx + c = 0$, roots can be found using $-b \pm \sqrt{(b^2 - 4ac)} \div 2a$.

Age Relation Problems

Always define variables for current ages. If product and difference/linear relations are given, substitution leads to a quadratic form.

Q65. Answer: (a) Pack

The logic followed here is:-

• A group of lions is called a pride.

Similarly,

• A group of wolves is called a pack.

Hence, "option 1" is the correct answer.

Additional Information

• The plural form of the word wolf is wolves.

Q66. Answer: (c) Disgrace

The logic followed here is:-

• "Honour" is a synonym of "nobility".

Similarly,

• "Humiliate" is the synonym of "disgrace".

Hence, "option 3" is the correct answer.

Q67. Answer: (d) R/4

The correct answer is R/4.

Concept:

Resistance:

• The measurement of the opposition of the flow of electric current through a conductor is called the resistance of that conductor. It is denoted by R.

There are mainly two ways of the combination of resistances:

1. Resistances in series:

• When two or more resistances are connected one after another such that the same current flows through them are called as resistances in series.

• The net resistance/equivalent resistance (R) of resistances in series is given by:

• Equivalent resistance, R = R1 + R2

2. Resistances in parallel:

• When the terminals of two or more resistances are connected at the same two points and the potential difference across them is equal is called resistances in parallel.

• The net resistance/equivalent resistance(R) of resistances in parallel is given by:

1/(R_(eff)) = 1/R1 + 1/R2

Explanation:

When Four resistors of R Ω are connected in parallel.

1/(R_(eff)) = 1/R1 + 1/R2+ 1/R3 + 1/R4

1/(R_(eff)) = 1/R + 1/R+ 1/R + 1/R

Reff = R/4

Additional Information

Series Combination	Parallel Combination
In series, voltage is divided through each of the connected resistors.	In parallel, the current is divided through each connected resistor.
In series, the Current will be the same throughout the circuit.	In parallel, Voltage will be the same throughout the circuit.

Q68. Answer: (c) 206

The logic followed here is:-

Key Points

• The number 206 does not follow the pattern of the given series.

• Therefore, 206 does not belong to the series.

Hence, "option 3" is the correct answer.

Q69. Answer: (c) 25/36 %

Given:

15 minutes of 3/2 day

Concept used:

1 hour = 60 minutes

1 min = 60 seconds

Calculation:

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3/2 of a day = 24 × 3/2 = 36 hours

36 hours = (36 × 60) minutes

So, 15 minutes of 3/2 day = (15/(36 × 60)) × 100% = (25/36)%

Q70. Answer: (c) Saturday

• Concept:

No. of Odd days	Ordinary Year	Leap Year
365 ÷ 7 = 52 weeks + 1 odd day	366 ÷ 7 = 52 weeks + 2 odd day	

Years	No. of odd days
100 years	5
200 years	3
300 years	1
400 years	0

• Note: Multiple of 400 years i.e. 800, 1200, 1600, 2000 have 0 odd days.

• Calculating leap year: For Finding the number of leap year (1 - 99) years, divide the number of years by 4 and the quotient will be the number of leap years.

• Code for weekdays:

No. of odd days	Day
0	Sunday
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday

• 2008 = 2000 + 7 years + year 2008

• In 2000 years, odd days = 0

• In 7 years (from 2001 to 2007), = 7/4 = 1 leap year and 6 normal years.

• In 1 leap year, odd days = 2, and 6 normal years = 6 odd days

• So total = 2 + 6 = 8 odd days i.e. 8/7 = 1 odd day

• In 2008, the number of days up to 3 May = 31 (Jan) + 29 (Feb - leap year) + 31(Mar) + 30(Apr) + 3(May) = 124/7 = 5 odd days.

• Total in 2008 years up to 3 May = 0 + 1 + 5 = 6 odd days.

The codes for the weekdays are as follows:

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0	1	2	3	4	5	6

• The day of the week on 3 May 2008 was Saturday.

Hence, "option 3" is the correct answer.

Q71. Answer: (c) Only argument I is strong.

The statement suggests that people should respect the national anthem.

• Argument I agrees with the statement and justifies that as the citizens of the country, people should show respect and pride by standing upright during the national anthem. There is no loss in standing upright when the national anthem is being played. On the contrary, one may feel a sense of patriotism during the act. So, argument I is strong.

• Argument II disagrees with the statement suggesting it to be unnecessary patriotism. However, the word "unnecessary" is used without justifying why is it unnecessary or useless. Rather, it can be considered as one of the ways in which patriotism can be cultivated or sustained. Thus, argument II is not strong.

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Hence the correct answer is option 3.

Q72. Answer: (c) Neither conclusion I nor conclusion II is correct.

It is given that Pravalika is in standard 10th. We do not know anything about Pranita from the question statement.

• Since Pranita is Pravalika's classmate, they could be about the same age.

• It cannot be determined who is older until we know the age details of both persons.

• The age details of Pranita and Pravalika are not mentioned in the conclusions.

• So, none of the conclusions is correct.

Hence the correct answer is option 3.

Q73. Answer: (a) Will decrease

The correct answer is Will decrease.

• If the humidity in the atmosphere is high, the rate of evaporation is low because the air is filled with water vapor and is not able to take up more humidity. Thus, the evaporation process slows down.

Key Points

• Evaporation is a form of vaporization that usually occurs at the surface of a liquid and involves the transition of liquid particles to the gaseous phase.

• Therefore, this process is said to involve a change in the state of the fluid.

• The surrounding gas should not saturate with the substance to be evaporated.

• The rate of evaporation is greater at higher temperatures because as the temperature rises, the amount of energy required for evaporation decreases.

• Water loss by evaporation in sunny, warm weather is greater than in cloudy and cool weather.

• The moisture content of the air, or water vapor content, also has an effect on evaporation.

• The lower the relative humidity, the drier the air, and the higher the rate of evaporation.

• The more moist the air, the closer the air is to saturation, and the less evaporation can take place.

• Also, warm air can have a higher concentration of water vapor, so you might think that warm air has more room to store more water vapor than cool air.

Q74. Answer: (c) 12 and 360

Shortcut Trick

For the numbers 60 and 72:

HCF is the Highest Common Factor: $60 = 12 \times 5$ and $72 = 12 \times 6$. Common factor is 12.

LCM is the Least Common Multiple: $12 \times 5 \times 6 = 360$.

Therefore The correct answer is 12 and 360.

Alternate Method

Given: Numbers are 60 and 72.

Formula Used: Prime Factorization Method.

Step 1: Prime factors of 60:

=> $60 = 2 \times 2 \times 3 \times 5 = 2^2 \times 3^1 \times 5^1$

Step 2: Prime factors of 72:

=> $72 = 2 \times 2 \times 2 \times 3 \times 3 = 2^3 \times 3^2$

Step 3: Finding HCF (product of lowest powers of common factors):

=> $HCF = 2^2 \times 3^1 = 4 \times 3 = 12$

Step 4: Finding LCM (product of highest powers of all factors):

=> $LCM = 2^3 \times 3^2 \times 5^1 = 8 \times 9 \times 5 = 360$

Therefore The correct answer is 12 and 360.

Additional Information

Product Rule

For any two numbers a and b, Product of numbers = HCF(a, b) × LCM(a, b). In this case, $60 \times 72 = 4320$ and $12 \times 360 = 4320$.

HCF and LCM of Fractions

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

Co-prime Numbers

The HCF of two co-prime numbers is always 1, and their LCM is always the product of the two numbers.

Q75. Answer: (b) Rs. 1200

Shortcut Trick

Since the denominator (9) is same for both fractions, we can use the unitary method on the numerators.

Cost of 1 unit = Rs. 300

Cost of 4 units = 4 × 300 = Rs. 1200

Therefore The correct answer is Rs. 1200.

Alternate Method

Given:

Cost of 1/9 part of pizza = Rs. 300

Formula Used:

Total Cost = (Cost of part) ÷ (Fractional part)

Calculations:

=> Let the total cost of the pizza be 'x'.

=> (1/9) × x = 300

=> x = 300 × 9 = Rs. 2700

=> Cost of 4/9 of pizza = (4/9) × 2700

=> Cost = 4 × 300

=> Cost = Rs. 1200

Therefore The correct answer is Rs. 1200.

Additional Information

Unitary Method

A technique where we find the value of a single unit first and then multiply it by the required number of units.

Fractional Comparison

If the denominators are the same, the values are directly proportional to their numerators (e.g., if a/n = x, then b/n = (x/a) × b).

Q76. Answer: (c) Slow neutralization i.e. Acid + Base → H2 + salt

The correct answer is Slow neutralization i.e. Acid + Base → H2 + salt.

• Slow neutralization i.e. Acid + Base → H2 + salt is not correct about acids.

Key Points

• The terms acid and base have been defined in different ways, depending on the particular way of looking at the properties of acidity and basicity.

• Arrhenius first defined acids as compounds that ionize to produce hydrogen ions, and bases as compounds that ionize to produce hydroxide ions.

• According to the Lowry-Bronsted definition, an acid is a proton donor and a base is a proton acceptor.

• In order to find the numeric value of the level of acidity or basicity of a substance, the pH scale (wherein pH stands for ‘potential of hydrogen) can be used.

• The pH scale is the most common and trusted way to measure how acidic or basic a substance is.

• A pH scale measure can vary from 0 to 14, where 0 is the most acidic and 14 is the most basic a substance can be.

Additional Information

• Theories of Acids and Bases:

• The Arrhenius theory of acids and bases states that an acid generates H+ ions in a solution whereas a base produces an OH– ion in its solution.

• The Bronsted-Lowry theory defines an acid as a proton donor and a base as a proton acceptor.

• Finally, the Lewis definition of acids and bases describes acids as electron-pair acceptors and bases as electron-pair donors.

Important Points

• Forms H+ in an aqueous medium/liquid state:

• An Arrhenius acid is a substance that dissociates in water to form hydrogen ions (H+). In other words, an acid increases the concentration of H+ ions in an aqueous solution.

Q77. Answer: (d) D

The logic followed here is:-

• The closest to the question figure is its mirror image in figure D.

Hence, "option 4" is the correct answer.

Q78. Answer: (d) Connective tissue

The correct answer is Connective tissue.

• Ligaments and Tendons are made up of connective tissue.

Key Points

• Connective tissue, as the name implies, is a term given to several different tissues of the body that serve to connect, support, and help bind other tissues in the body.

• Connective tissue can further be broken down into three categories:

• loose connective tissue, dense connective tissue, and specialized connective tissue.

• Loose connective tissue works to hold organs in place and is made up of extracellular matrix and collagenous, elastic, and reticular fibers.

• Dense connective tissue is what makes up tendons and ligaments and consists of a higher density of collagen fibers.

• Examples of specialized connective tissues are adipose tissue, cartilage, bone, blood, and lymph.

Additional Information

• Nervous system:

• The nervous system is a complex network of nerves and cells that carry messages to and from the brain and spinal cord to various parts of the body.

• Muscle tissue:

• Muscle tissue is composed of cells that have the special ability to shorten or contract in order to produce movement of the body parts.

• Epithelial tissue:

• The epithelium is a type of body tissue that forms the covering on all internal and external surfaces of your body, lines body cavities and hollow organs and is the major tissue in glands.

Q79. Answer: (b) Shri Chennamaneni Vidyasagar Rao

The correct answer is Shri Chennamaneni Vidyasagar Rao.

• Shri Chennamaneni Vidyasagar Rao is the present Governor of Maharashtra.

Key Points

• Chennamaneni Vidyasagar Rao is an Indian politician from Telangana, associated with the Bharatiya Janata Party.

• He served as the Governor of Maharashtra from 2014 to 2019.

• As a member of the Bharatiya Janata Party, he served as the Union Minister of State in the Ministry of Home Affairs in the government of Atal Bihari Vajpayee from 1999.

• He was elected to the Lok Sabha from Karimnagar (Lok Sabha constituency) in 1998 and 1999 (13th Lok Sabha).

Important Points

• As of June 2022,

• Present Governor of Maharashtra: Bhagat Singh Koshyari.

• Chief Minister of Maharashtra: Eknath Shinde

• Home Minister of Maharashtra: Anil Deshmukh.

• Present Commissioner of Police of Mumbai: Hemant Nagrale.

• Shri C. Subramaniam:

• He served as Minister of Finance and Minister of Defence in the union cabinet. He later served as the Governor of Maharashtra.

• He was awarded Bharat Ratna, India's highest civilian award, in 1998, for his role in ushering Green Revolution.

• He also worked as the Deputy Chairman of the Planning Commission from 2 May 1971 to 22 July 1972.

• Shri S.C. Jamir:

• Jamir is an Indian politician and former Governor of Odisha.

• He has served as the Chief Minister of Nagaland, Governor of Maharashtra, Governor of Gujarat & Governor of Goa.

• He was awarded the third-highest Civilian Award in India, Padma Bhusan in 2020 for his work in public affairs.

• Dr. P. C. Alexander:

• He served as the Governor of Tamil Nadu from 1988 to 1990 and as the Governor of Maharashtra from 1993 to 2002.

• He was also a member of the Rajya Sabha representing Maharashtra as an independent candidate from 29 July 2002 to 2 April 2008.

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Q80. Answer: (b) 63

The correct answer is 63.

• 63 elements were known when Mendeleev started his work.

Key Points

• Mendeleev's Periodic Law: The physical and chemical properties of elements are periodic functions of their atomic masses.

• Mendeleev arranged all the elements known at that time in increasing order of atomic mass and this arrangement became a periodic table.

• In Mendeleev's Periodic Table: The total number of periods in the periodic table was seven and the total number of groups was nine.

• That is, 63 elements were known when Mendeleev started his work.

Important Points

• At present we know 118 elements. All of these have different properties. Of these 118, only 94 occur naturally.

Q81. Answer: (c) 441

The logic followed here is:-

• $\sqrt{676} = 26$; $26 + 3 = 29$; $29^2 = 841$

Similarly,

• $\sqrt{324} = 18 = 18 + 3 = 21 = 212 = 441$

Hence, "option 3" is the correct answer.

Q82. Answer: (d) Oxalic acid

The correct answer is Oxalic acid.

• Oxalic acid is an organic acid.

Key Points

• An organic acid is an organic compound with acidic properties. The most common organic acids are carboxylic acids, whose acidity is associated with their carboxyl group COOH.

• In general, organic acids are weak acids and do not dissociate completely in water, whereas strong mineral acids do.

• Organic acids are used in food preservation because of their effects on bacteria.

Additional Information

• Carbonic acid:

• Carbonic acid, (H_2CO_3), is a compound of the elements hydrogen, carbon, and oxygen. It is formed in small amounts when its anhydride, carbon dioxide (CO_2), dissolves in water.

• Sulfuric acid:

• Sulfuric acid, known in antiquity as oil of vitriol, is a mineral acid composed of the elements sulfur, oxygen, and hydrogen, with the molecular formula H_2SO_4.

• Nitric acid:

• Nitric acid is a nitrogen oxoacid of formula HNO_3 in which the nitrogen atom is bonded to a hydroxy group and by equivalent bonds to the remaining two oxygen atoms.

Q83. Answer: (d) C

The logic followed here is:-

• Figure 1 to figure 2:

• The symbol S has rotated 90° anticlockwise.

• The water image of a parallelogram is given.

• In the second figure, both shapes interchange their positions.

• Similarly, figure 3 to figure 4:

• The symbol B has rotated 90° anticlockwise.

• The water image of a rhombus is given.

• In the fourth figure, both shapes interchange their positions.

Hence, "option 4" is the correct answer.

Q84. Answer: (d) Hertz

The correct answer is Hertz.

• Frequency is expressed in Hertz and indicates that the event is repeated every second.

Key Points

• The number of periods or cycles per second is called frequency. The SI unit for frequency is the hertz (Hz). One hertz is the same as one cycle per second.

• Frequency refers to the number of occurrences of a periodic event per time and is measured in cycles/seconds.

• Any electromagnetic wave's frequency multiplied by its wavelength equals the speed of light.

Additional Information

• The hertz (symbol: Hz) is the unit of frequency in the International System of Units (SI) and is defined as one cycle per second.

• A hertz is an SI-derived unit whose expression in terms of SI base units is s^(−1), meaning that one hertz is the reciprocal of one second.

• It is named after Heinrich Rudolf Hertz, the first person to provide conclusive proof of the existence of electromagnetic waves.

Important Points

Unit	Unit of
Ohm	Electrical resistance
Decibel	Sound intensity
Ampere	Electric current

Q85. Answer: (a) Gujarat

The correct answer is Gujarat.

• The Wild Ass Sanctuary is located in Gujarat.

Key Points

• The wild ass, locally known as Ghudkhar and found only in the small Rann of Kutch in Gujarat in India.

• Wild Ass Sanctuary is located in the Little Rann of Kutch in Gujarat, the Wild Ass Sanctuary is the only place on earth where Indian wild ass still roam free.

• Wild Ass Sanctuary is the largest wildlife sanctuary in the country which is spread over an area of 4954 sq. km.

• It was established in 1972, a year later the Wild Ass Sanctuary came under the Wildlife Protection Act 1972. The three entry points to the sanctuary are Bajna, Adeshwar, and Jinjhwada.

Additional Information

State	Wildlife sanctuary
Gujarat	• Rampara wildlife sanctuary. - Mitiyala wildlife sanctuary. - Jambughoda wildlife sanctuary.
Goa	• Bondla wildlife sanctuary. - Madei wildlife sanctuary. - Bhagavan Mahavir wildlife sanctuary.
Odisha	• Debrigarh Wildlife Sanctuary. - Sunabeda Wildlife Sanctuary. - Hadagarh Wildlife Sanctuary.
Maharashtra	• Koyna Wildlife Sanctuary. - Mhasdi wildlife sanctuary. - Mayureshwar Wildlife Sanctuary.

Q86. Answer: (a) A

The figure formed from the shapes given in the question figure is given below:

• Hence, "option 1" is the correct answer.

Q87. Answer: (c) Steam

The correct answer is Steam.

• Steam is a surface phenomenon.

Key Points

• The properties of liquid which can be only seen at the free surface of the liquid is a surface phenomenon.

• For example, surface tension is a surface phenomenon in which the free liquid surface acts like a stretched membrane due to tensile forces acting on each liquid particle due to adjacent liquid particles.

• This force is called Surface tension force. Also, evaporation of the liquid is a surface phenomenon in which the topmost layer of liquid is converted into vapor without reaching the boiling point.

• Evaporation is a surface phenomenon because it occurs on the surface.

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• For example, when we put wet clothes for drying we spread them out so that the surface area gets increased. When the surface area increases the water will get enough space to get into the vapor stage and thus evaporation happens easily.

Q88. Answer: (c) 9.5 A

The correct answer is 9.5 A.

Key Points

• Solution:

• V=60V

• I=4A.

• R=V / I

• R =60 / 40

• R =15Ω.

• When potential difference is increased to 142.5V.

• I=V / R

• I =142.5 / 15

• 9.5 A.

Q89. Answer: (a) 16/63

Given:

4/7 × 4/9

Calculation:

4/7 × 4/9

=> 16/63

Therefore The required value of 4/7 × 4/9 is 16/63.

Q90. Answer: (c) Both (1) and (2) follows.

The Venn diagram is given below:-

Conclusion:

1. All clips are books. → True (All clips are pins, all pins are books. So, all clips are books is correct. This is visible in the above Venn diagram.)

2. Some pins are clips. → True (All clips are pins, so some pins are clips also correct. As can be seen in the Venn diagram, a part of pin is clip.)

Hence, "option 3" is the correct answer.

Q91. Answer: (b) A only

A is the only correct answer.

Main points

Concept :

• Newton's law of universal gravitation: Every object in the universe attracts every other object with a force directly proportional to the product of their masses and inversely proportional to the square of the distance between them.

=> $F = Gm1m2/(r^2)$

Where, F = gravitational force between objects, m 1 = mass of one object, m 2 = mass of second object, r = distance between centers of two objects and G = universal gravitational constant

• Universal Gravitational Constant (G): It is an empirical constant that gives the relationship between the force of gravity, the mass of a body and the distance between them.

• The value of G is 6.67 × 10 -11 Nm 2 / kg 2.

Description :

• The universal gravitational constant (G) is an empirical constant that does not depend on anything.

• The value of G is constant everywhere in the universe. So statement A is correct and statement C is false.

• It does not depend on the mass or distance between the two bodies or the medium in which the bodies are placed.

• If the mass of two objects is doubled, the force becomes

=> $F' = (Gm'1m'2)/(r^2)=(G2m1\times 2m2)/(r^2)=4Gm1m2/(r^2)=4F$

• So statement C is false.

• The value of acceleration due to gravity is different at different places, the value of g on the surface of the Earth is 9.8 m/s 2 and

the value of g on the surface of the Moon is g e /6. So statement D is wrong.

Q92. Answer: (a) Speedometer

The correct answer is Speedometer.

• A speedometer helps to know the speed of the vehicle.

Key Points

• A speedometer, an instrument that indicates the speed of a vehicle, is usually combined with a device known as an odometer that records the distance traveled.

• The speedometer records the speed in km/h.

• The odometer records the distance traveled by the vehicle.

• Odometer is also used by people who construct roads and survey lands.

• A speedometer is a gauge that tells you the velocity of the vehicle at that moment.

Important Points

• Voltometer: A voltmeter is an instrument used for measuring the electric potential difference between two points in an electric circuit.

• Velometer: A velometer is a device used to measure the speed of air in a given area.

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

Q93. Answer: (a) (-17)/36

Given:

(5/6× 1/3) + (1/3× 1/2) - (11/4× 1/3)

Concept used:

Calculation:

(5/6× 1/3) + (1/3× 1/2) - (11/4× 1/3)

=> (5/18) + (1/6) - (11/12)

=> (-17/36)

Therefore The required value of (5/6× 1/3) + (1/3× 1/2) - (11/4× 1/3) is (-17/36).

Q94. Answer: (c) 60°

Shortcut Trick

In any triangle, the sum of all internal angles is always 180°.

Since all three angles are equal, each angle = 180° ÷ 3.

Each angle = 60°.

Therefore The correct answer is 60°.

Alternate Method

Given: All three angles of the triangle are equal.

Formula Used: Sum of internal angles of a triangle = 180°.

Let each equal angle be x.

=> x + x + x = 180°

=> 3x = 180°

=> x = 180° ÷ 3

=> x = 60°

Therefore The correct answer is 60°.

Additional Information

Equilateral Triangle

A triangle where all three sides are equal and all three angles are 60° each.

Isosceles Triangle

A triangle with at least two equal sides, and the angles opposite those sides are also equal.

Angle Sum Property

The sum of the interior angles of any n-sided polygon is given by (n − 2) × 180°.

Q95. Answer: (b)

The least possible Venn diagram is as follows:

Conclusion:

I. No string being violin is a possibility. → False (All violins are strings, so it is not possible.)

II. Some guitars are not strings. → False (There is no direct negative relation between Guitar and String, So it doesn't follow.)

(Given Venn diagram follows all the statements. From the diagram we can determine that "conclusion 2 is not correct".)

Hence, "option 2" is the correct answer.

Q96. Answer: (d) V

The logic followed here is:-

Hence, "option 4" is the correct answer.

Q97. Answer: (a) 0.6241

Shortcut Trick

Square of 8.71 must end with the digit 1 as $1^2 = 1$.

$\sqrt{(75.24 + x)} = 8.71 \Rightarrow 75.24 + x = (8.71)^2$

Since $8.7^2 = 75.69$, the value of x must be around $75.69 - 75.24 = 0.45$.

Checking the options, 0.6241 is the closest value matching the decimal precision.

Therefore The correct answer is 0.6241.

Alternate Method

Given: $\sqrt{(75.24 + ?)} = 8.71$

Formula Used: Square both sides to remove the square root: $(\sqrt{x})^2 = x$

$\Rightarrow 75.24 + x = (8.71)^2$

$\Rightarrow 75.24 + x = 8.71 \times 8.71$

$\Rightarrow 75.24 + x = 75.8641$

$\Rightarrow x = 75.8641 - 75.24$

$\Rightarrow x = 0.6241$

Therefore The correct answer is 0.6241.

Additional Information

Squaring Decimals

When a number with n decimal places is squared, the result has 2n decimal places. Here, 8.71 has 2 places, so its square has 4 places.

BODMAS Rule

Always solve terms inside the square root or brackets first before applying external operations like addition or subtraction.

Estimation Technique

Use nearby whole numbers to estimate: $8^2 = 64$ and $9^2 = 81$. Since 8.71 is closer to 9, the square must be slightly less than 81.

Q98. Answer: (d) 55/6√30 km/hr

Shortcut Trick

When two objects move in opposite directions and meet, then reach their destinations in times T_a and T_b:

Speed ratio $(S_a / S_b) = \sqrt{(T_b / T_a)}$

$\Rightarrow 55 / S_b = \sqrt{(6 / 5)}$

$\Rightarrow S_b = 55 \times \sqrt{(5 / 6)} = 55 \times (\sqrt{30} / 6)$

Therefore The correct answer is $(55/6)\sqrt{30}$ km/hr.

Alternate Method

Given:

Speed of Car A (S_a) = 55 km/hr

Time taken by Car A after meeting (T_a) = 5 hours

Time taken by Car B after meeting (T_b) = 6 hours

Formula Used:

$S_a / S_b = \sqrt{(T_b / T_a)}$

Calculations:

$\Rightarrow 55 / S_b = \sqrt{(6 / 5)}$

=> 55 / S_b = √6 / √5

=> S_b = (55 × √5) / √6

=> Rationalizing the denominator: S_b = (55 × √5 × √6) / (√6 × √6)

=> S_b = (55 × √30) / 6

Therefore The correct answer is (55/6)√30 km/hr.

Additional Information

Meeting Time Formula

If two bodies start at the same time and meet after time t, then t = √(T_a × T_b), where T_a and T_b are times taken after meeting.

Relative Speed

When moving in opposite directions, relative speed = S_a + S_b. When moving in the same direction, relative speed = |S_a − S_b|.

Time and Distance Relation

For a constant distance, Speed is inversely proportional to time: S1 / S2 = T2 / T1.

Q99. Answer: (a) C_nH_(2n+2)

The correct answer is CnH2n+2.

• Alkanes are saturated hydrocarbons in which a bond is found between two carbon atoms. And its general formula is CnH2n+2.

Key Points

• Alkanes are organic compounds that consist entirely of single-bonded carbon and hydrogen atoms and lack any other functional groups.

• Alkanes are also saturated hydrocarbons. Alkanes are the simplest and least reactive hydrocarbon species containing only carbons and hydrogens.

• Alkanes have the general formula CnH2n+2and can be subdivided into the following three groups:

• The linear straight-chain alkanes.

• Branched alkanes.

• Cycloalkanes.

• Alkanes have densities between 0.6 and 0.8 g/cm3, so they are less dense than water. Thus gasoline, which is largely a mixture of alkanes, is less dense than water and will float on water.

Q100. Answer: (b) –11

Shortcut Trick

If (3x − 2) is a factor, then substituting x = 2/3 into the polynomial must result in zero.

15(2/3)² − k(2/3) − 14 = 0

20/3 − 2k/3 − 14 = 0

Multiply the whole equation by 3: 20 − 2k − 42 = 0

−22 − 2k = 0 => k = −11

Therefore The correct answer is −11.

Alternate Method

Given:

The polynomial is p(x) = 15x² − kx − 14.

The factor is (3x − 2).

Formula Used:

According to the Factor Theorem, if (ax − b) is a factor of the polynomial p(x), then p(b/a) = 0.

Calculations:

=> 3x − 2 = 0

=> 3x = 2

=> x = 2/3

Substitute x = 2/3 in p(x):

=> p(2/3) = 15(2/3)² − k(2/3) − 14 = 0

=> 15(4/9) − 2k/3 − 14 = 0

=> (5 × 4)/3 − 2k/3 − 14 = 0

=> 20/3 − 2k/3 − 14 = 0

=> (20 − 2k − 42) / 3 = 0

=> −2k − 22 = 0

=> 2k = −22

=> k = −11

Therefore The correct answer is −11.

Additional Information

Factor Theorem

A polynomial f(x) has a factor (x − a) if and only if f(a) = 0. It is a special case of the remainder theorem.

Remainder Theorem

When a polynomial p(x) is divided by a linear divisor (ax − b), the remainder is given by p(b/a).

Quadratic Roots Property

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

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