RRC Group D Previous Year Paper 42 (Held On: 16 Oct 2018 Shift 3)

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

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CBT

Q1. A stone is tied to a spring balance. Under which of the following conditions the reading on spring balance will show the least weight?

(a) When the stone is completely submerged in the water in a beaker.
(b) When the stone is on the surface of water taken in a beaker.
(c) When the stone is suspended in air.
(d) When the stone is partially submerged in the water in a beaker.

Q2. The square roots of how many factors of 2250 will be natural numbers?

(a) 6
(b) 5
(c) 15
(d) 4

Q3. Who is the first Indian female cricketer to score 2000 runs in T20 International Cricket ?

(a) Harmanpreet Kaur
(b) Mithali Raj
(c) Smriti Mandhana
(d) Poonam Raut

Q4. Consider the given question and decide which of the following statements is sufficient to answer the question.

What is the weight of ten iron balls if each ball is of the same weight?

Statements:

1. One-fourth of each ball’s weight is 5 kg.
2. The total weight of three iron balls is 20 kg more than the total weight of two iron balls.

(a) Statement 1 and 2 alone is sufficient
(b) Statement 1 alone is sufficient while statement 2 alone is insufficient
(c) Statement 2 alone is sufficient while statement 1 alone is insufficient
(d) Both statement 1 and 2 are sufficient

Q5. The point at which the perpendicular bisectors of the sides of a triangle intersect is known as

(a) circum-centre
(b) orthocentre
(c) centroid
(d) in-center

Q6. When a 50-decimetre long ladder is placed with the wall, it reaches upto the window only. If the window is 48 decimeter up from the land, then find out the distance of the lower face of the ladder from the wall.

(a) 12 decimeter
(b) 14 decimeter

(c) 10 decimeter
(d) 11 decimeter

Q7. Which of the following statements is true?

(a) The Mass and Weight of the body remain the same in different places.
(b) The Mass of a body remains same while the Weight changes from place to place.
(c) The Mass and weight of a body change from place to place.
(d) The Mass of a body changes from place to place while the Weight remains the same.

Q8. Which of the following can neither be created nor be destroyed ?

(a) Energy
(b) Force
(c) Momentum
(d) power

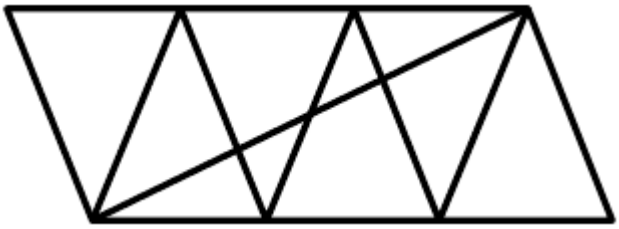
Q9. A 4Ω resistance wire doubled on it. Calculate the new resistance of the wire.

(a) 1.5 Ω
(b) 2.00 Ω
(c) 1.00 Ω
(d) 1.25 Ω

Q10. Sultanpur National Park is in _____.

(a) Rajasthan
(b) Delhi
(c) Haryana
(d) Punjab

Q11. How many triangles are present in the given figure?



(a) 8
(b) 6
(c) 20
(d) 10

Q12. Who is the Chief Editor of the news channel Times Now ?

(a) Rahul Shivshankar
(b) Arnab Goswami
(c) Ravish Kumar
(d) Sonia Singh

Q13. Jayant covers a certain distance in 21/2 hours at a speed of 54 km/h. how much time will Prabhu take to cover the same distance at a speed of 72 km/h?

(a) 21/2 hours
(b) 21/5 hours
(c) 17/8 hours
(d) 3 hours

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Q14. 16, 32, 64, 128,..... The sum of first 10 numbers in the series is:

(a) 16386
(b) 16638
(c) 16368
(d) 13668

Q15. If in a certain language, TREE is coded as USFF, how will MANGO be coded in that language?

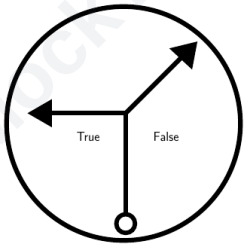
(a) BHONC
(b) OPHNB
(c) NOPHB
(d) NBOHP

Q16. In which country was the Sano Cricket Festival organised by ICC in 2018 ?

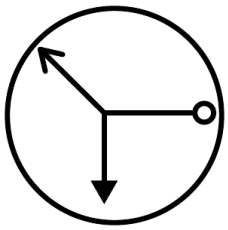
(a) Britain
(b) Japan
(c) Australia
(d) Sri Lanka

Q17. Select the figure that is different from the other three.

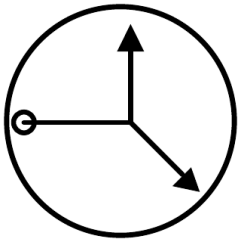
(a)



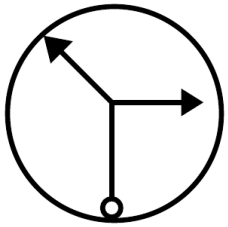
(b)



(c)



(d)



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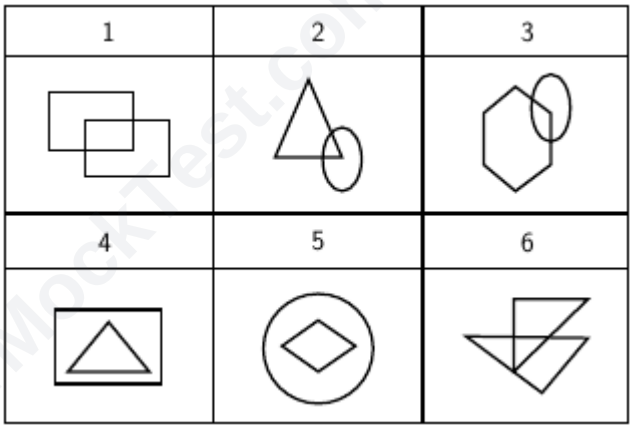
Q18. Motion of a body with constant speed in a circular path is called:

(a) Circulatory motion
(b) Oscillatory motion
(c) Non-uniform circular motion
(d) Uniform circular motion

Q19. The inner and outer circumference of a circular ring is 22 cm and 44 cm respectively. What is the thickness of the ring ?

(a) 2.5 cm
(b) 1.5 cm
(c) 5.5 cm
(d) 3.5 cm

Q20. Select the option that groups together the following figures logically.



(a) 1, 2; 3, 4; 5, 6
(b) 1, 6; 2, 3; 5, 4
(c) 1, 5; 2, 6; 3, 4
(d) 1, 4; 2, 5; 3, 6

Q21. Consider the following statements to be true even if they seem to be a variance from commonly known facts and decide which of the conclusions logically follows from the statements.

Statement:

Some spoons are glasses

All the plates are glasses

Conclusions:

Some glasses are plates

Some glasses are spoons

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

Q22. The forces between two bodies are always:

(a) isolated forces
(b) unequal and in the opposite direction
(c) equal and in the same direction
(d) equal and in the opposite direction

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Q23. A girl is observing a bird that is sitting at a height of 500 m from the ground. The angle of elevation of the bird from the girl's eyes is 45° at the initial position. After some time, the girl moves on the ground towards the bird by 50 m and the bird flies away from her. At this point, the angle of elevation reduces to 30°. Find the distance travelled by the bird. Take √3 = 1.73.

(a) 415 m
(b) 915 m
(c) 315 m
(d) 365 m

Q24. Select the option that is related to the third term in the same way as the second term is related to the first term:

Deep : Shallow : : Best : _____

(a) Meagre
(b) Good
(c) Better
(d) Worst

Q25. Which of the following newspapers was written by Lokmanya Tilak during Indian National movement ?

(a) Yugntar
(b) Bengalee
(c) Kesari
(d) Amrit bazaar patrika

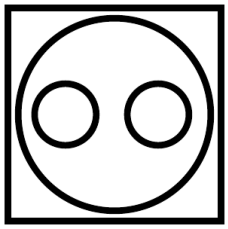
Q26. Find the LCM of 63 and 140.

(a) 63
(b) 14
(c) 126
(d) 1260

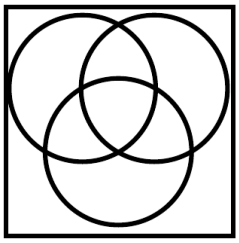
Q27. Identify the Venn diagram that best represents the following classes:

Grapes, Pineapples, Fruits:

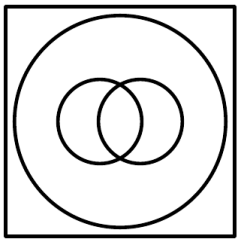
(a)



(b)

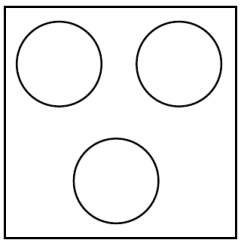


(c)



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(d)



Q28. Pabitra had 192/7l of petrol in the fuel of his vehicle at the start of a journey. During the journey 131/2l of petrol was consumed. What fraction of the initial petrol was left in the fuel tank after the journey?

(a) 11/40
(b) 3/10
(c) 3/5
(d) 7/10

Q29. Read the following table carefully and answer the question given below:

Classification of 100 students based on the marks obtained by them in Mathematics and Science in an Engineering Entrance Examination

Mark out of 50	40 and above	30 and above	20 and above	10 and above	0 and above
Subject					
Maths	23	26	70	90	100
Science	15	36	75	95	100
(Aggregate) Average	19	31	80	93	100

The number of students scoring less than 60% marks aggregate is:

(a) 69
(b) 65
(c) 50
(d) 27

Q30. An ultrasonic sound wave has a frequency higher than:

(a) 20 Hz
(b) 200 Hz
(c) 20000 Hz
(d) 2000 Hz

Q31. Which of the following sets are the best insulators ?

(a) Rubber, glass, plastics, ebonite, cotton, copper
(b) Silver, copper, gold, iron
(c) Bakelite, dry air, paper, ebonite, aluminium
(d) plastics, ebonite, paper, cotton, Bakelite, dry air, rubber

Q32. A table costing Rs. 750 was sold at 4% loss. Find out the selling price of the table.

(a) Rs. 720
(b) Rs. 745
(c) Rs. 730
(d) Rs. 780

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Q33. Solve the below equation.

(1 + 2)/({1 + 2/((1 + 1/3))}) = ?

(a) 9/4
(b) 21/5
(c) 6/5
(d) 21/4

Q34. Identify the equation of the line with slope = - 4 and y – intercept = 2

(a) 2x + y/2 = 1
(b) 2x + y/3 = 1
(c) 2x + y = 1
(d) 2x + y/4 = 1

Q35. Who among the following conducts the Oath of Office for the President of India ?

(a) The Prime Minister of India
(b) The Attorney General of India
(c) The Chief Justice of India
(d) The Vice President of India.

Q36. Read the given statement(s) and conclusion carefully and select which of the options is possible

Statement:

1. Nitrogen is a gas.
2. This chamber has gas.

Conclusion:

This chamber contains nitrogen gas.

(a) True
(b) False
(c) Probably true or false
(d) Definitely false

Q37. The value of (-45 + 7 × 23 – (247 ÷ 13) – 11) ÷ 2 is:

(a) 86
(b) -14
(c) -47
(d) 43

Q38. Solve the following equation:

$(3^2 - 8^2)/((3 + 8)^2)$ = ?

(a) 5/11
(b) • 3/11
(c) 3/11
(d) -5/11

Q39. The Indian Government launched which scheme that aims to reduce expenditure by patients on treatment of cancer and cardiovascular diseases to make health care affordable for needy?

(a) AYUSH (Assuring Your Ultimate Security and Health)
(b) PADMA (Proper and Due Medical Assistance)
(c) AMRIT (Affordable Medicine and Reliable Implants for Treatment)
(d) MAARC (Medical Assistance At Reduced Cost)

Q40. Pipes A, B and C together can fill a tank in 4 hours. Pipes A and B together can fill the tank in 9 hours. If pipes A, B and C are opened simultaneously, and after 3 hours, pipes A and B are closed, then how many hours will C alone require to fill the tank?

(a) 1.5

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(b) 1.8
(c) 2
(d) 2.25

Q41. Which of the following is an example of a metal that needs to be stored under oil ?
(a) Iron
(b) Gold
(c) Silver
(d) Potassium

Q42. Read the given statement and choose which argument is strong.
Statement:
Playing outdoor games is better than being on a computer or playing mobile games.
Argument:
I. Yes, playing outdoor games keeps children physically and mentally fit.
II. No, computer or mobile games are more entertaining than outdoor games.
(a) Only argument 1 is strong
(b) Only argument 2 is strong
(c) Both arguments I and II are strong
(d) Neither argument I nor II is strong

Q43. 'A Billion Dreams' is a 2017 Indian docudrama-biographical film based on the life of which Indian cricketer ?
(a) Virat Kohli
(b) Sunil Gavaskar
(c) Sachin Tendulkar
(d) M. S. Dhoni

Q44. The ratio of two numbers is 5 : 6 and their LCM is 150. Find the sum of the two numbers.
(a) 50
(b) 55
(c) 60
(d) 54

Q45. Which of the following can undergo sublimation ?
(a) Ammonium chloride
(b) Ammonium sulphate
(c) Ammonium phosphate
(d) Ammonium chlorate

Q46. If Raj drives faster by 10 km/h, he reaches his village 90 minutes early. If he drives slower by 10 km/h, he reaches the village 150 minutes late. Find the distance he travels.
(a) 300 km
(b) 600 km
(c) 500 km
(d) 400 km

Q47. In 1781, Warren Hasting, the first Governor-General of India set up a Madarssa in _____ for the study and teaching of Muslim law.
(a) Bombay
(b) Calcutta
(c) Bihar
(d) Delhi

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Q48. When two equal forces are acting on a body and opposite in direction, the net force acting on a body becomes _____.

(a) zero
(b) four times
(c) two times
(d) three times

Q49. 4 boys visit a garden after every 3, 5, 2 and 6 days, respectively. How many times in a year will they visit the garden on the same day? Consider counting is done from the start of the year.

(a) 12
(b) 13
(c) 11
(d) 14

Q50. The aim of Setu Bharatam Programme of Government of India is:

(a) To build bridges that connect coastal areas
(b) To build bridges on national highways
(c) To build bridges across rivers and seas for transportation of goods
(d) To build bridges in rural areas

Q51. The distance between two places A and B is 245 km. Two cars, one from A and the other from B, start at the same time, travelling towards each other. If one car travels at a speed of 40 km/h and the other at 30 km/h, after how many hours will they meet?

(a) 23/4 hours
(b) 31/2hours
(c) 3 hours
(d) 2 hours

Q52. The Emmy Awards, seen in the news, are presented for excellence in which of the following fields ?

(a) Music
(b) Literature
(c) Cinema
(d) Television industry

Q53. Select the option in which the words share the same relationship as that shared by the given pair of words.

Barometer : Pressure

(a) Ammeter : Current
(b) Scale : Seconds
(c) Thermometer : Volume
(d) Voltmeter : Heat

Q54. Given below is a statement followed by two assumptions I and II. You have to consider the statement and the following assumptions and decide which of the assumptions is implicit in the statement.

Statement:

I like to cook food. I want to become a chef

Assumption:

1. I am a chef.

2. I am not a chef.

(a) Both assumptions 1 and 2 are implicit
(b) Only assumption 2 is implicit
(c) Only assumption 1 is implicit
(d) Either assumption 1 or 2 is implicit

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Q55. The 4^(th) and 5^(th) period contain _____ each.

(a) 11 elements
(b) 18 elements
(c) 9 elements
(d) 8 elements

Q56. Deen Dayal Antyodaya Yojana is also known as:

(a) National Urban Livelihood Mission
(b) National Rural Health Mission
(c) National Rural Livelihood Mission
(d) National Urban Health Mission

Q57. Read the given question and decide which of the following statements is/are sufficient to answer the question.

Question:

Which word represents ‘Give’ in the code language?

Statements:

1. Give me some tea is written as ‘De min to te’
2. ‘Please Give’ is written as ‘plea De’

(a) Statement 1 alone is sufficient.
(b) Statements 2 alone is sufficient.
(c) Statements 1 and 2 together are sufficient.
(d) Statements 1 and 2 together are insufficient.

Q58. Rani Lakshmi Bai died in the year _____ while fighting the British.

(a) 1859
(b) 1856
(c) 1858
(d) 1857

Q59. Fibers are absent in:

(a) Liver
(b) Heart
(c) Kidney
(d) Blood

Q60. Rs. 775, invested for 6 years gives an interest of Rs. 372. The rate of simple interest per annum is:

(a) 7.5%
(b) 9%
(c) 8%
(d) 7%

Q61. Solve the following equation:

$11 \div 3 + 1/9 - 5 \times 6 (1 \times 1/6) = ?$

(a) (- 11)/9
(b) 11/9
(c) 11/8
(d) (- 1)/9

Q62. The political party that won the majority of seats in 2017 Uttarakhand Legislative Assembly Elections is _____.

(a) NCP
(b) BJP
(c) RPI
(d) BSP

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Q63. Coming out of her house, Anya crossed a road, on reaching the other side of the road, she took a left turn and walked straight. If she is now in West, which direction was she facing before crossing the road?

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

Q64. What is mixing an acid with water that results in a decrease in the concentration of ions per unit volume called ?

(a) Concentration
(b) Acidification
(c) Neutralisation
(d) Dilution

Q65. What will come in place of question mark '?' in the following number series?

1, 8, 27, 64, ?, 216, 343

(a) 125
(b) 512
(c) 81
(d) 100

Q66. What does the KUSUM Scheme promote ?

(a) Solar farming
(b) Solar lighting in industries
(c) Solar heating in homes
(d) Solar-powered transport

Q67. The supplement of an angle is 15° more than three times its complement. The measure of the angle is:

(a) 57.5°
(b) 65°
(c) 52.5°
(d) 72.5°

Q68. The atmospheric pressure at sea level is _____ atm.

(a) 0.1
(b) 0.001
(c) 1
(d) 0

Q69. Which among the following players was awarded Padma Shri in 2017 for his/her contribution to Indian sports ?

(a) Devendra Jhajharia
(b) Bhupendra Singh
(c) Sekhar Naik
(d) Brij Bhushan Mohanty

Q70. Which of the following statements is true ?

(a) Oxygen diffuses from lungs into blood and carbon monoxide diffuses from blood into lungs
(b) carbon dioxide diffuses from lungs into blood and oxygen diffuses from blood into lungs.
(c) carbon monoxide diffuses from lungs into blood and oxygen diffuse from blood into lungs.
(d) Oxygen diffuses from lungs into blood and carbon dioxide diffuses from blood into lungs

Q71. The organs that have different basic structure (or different basic design) but have similar appearance and perform similar functions are called:

(a) fossils
(b) homologous organs
(c) analogous organs

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(d) biogenetic law

Q72. Read the given statement and choose which argument is strong.

Statement:

Watching cartoon movies is better than reading books.

Arguments:

1. Yes, watching cartoon movies is entertaining.

II. No, reading books inculcates love of knowledge and reading habit in children.

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

Q73. In the context of Indian economy, which of the following is a subject under the primary sector ?

(a) Banking
(b) Education
(c) Health
(d) Agriculture

Q74. Consider the following statements.

1. Mode can be computed from histogram
2. Median is not independent of the change of scale
3. Variance is independent of the change of origin and scale

Which of these is/are correct?

(a) Only (1) and (2)
(b) Only (1)
(c) All (1), (2) and (3)
(d) Only (2)

Q75. The reproductive parts of angiosperms are located in the

(a) leaves
(b) roots
(c) stems
(d) flowers

Q76. Select the best option to fill in the blank:

STAR : 1920118, MARS : 1311819, PARK: _____

(a) 1712812
(b) 1611811
(c) 1811611
(d) 1618111

Q77. You are given a question and two statements. Identify which of the statements is/are sufficient to answer the question.

Question:

Find the value of n.

Statements:

I) if $x^2 – nx + 1 = 0$

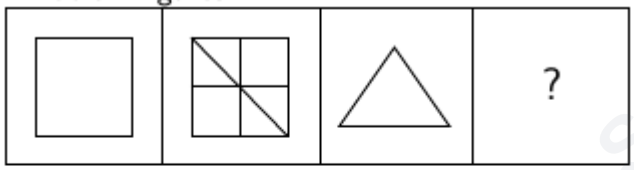
II) If the equation has solution as ‘x = 1’

(a) Both I and II are sufficient
(b) Either I or II is sufficient
(c) Only I is sufficient
(d) Only II is sufficient

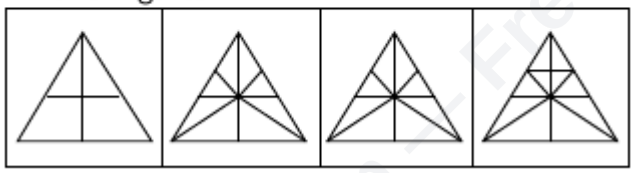
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Q78. Find the next figure for the given series:

Problem figures



Answer figures



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

Q79. In how many years will an amount be doubled at 28.75% annual rate of interest?

(a) 3.90
(b) 3.47
(c) 6.00
(d) 3.00

Q80. What happens when dilute hydrochloric acid is added to iron filings?

(a) Hydrogen gas and iron chloride are produced
(b) Only chloride are produced
(c) No reaction take place
(d) Only hydrogen gas is produced

Q81. Which one of the following promotes cell division ?

(a) Cytokinins
(b) Auxin
(c) Abscisic acid
(d) Gibberellins

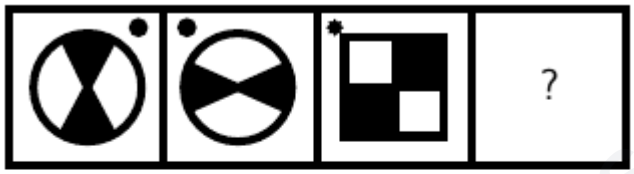
Q82. 1 joule/second = ?

(a) 1 watt
(b) 1 ohm
(c) 1 ampere
(d) 1 coulomb

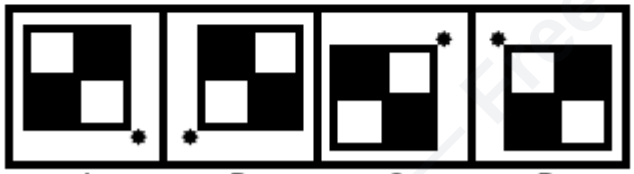
Q83. Study the following pattern and select the figure that relates to the third figure in the same way that the second figure relates to the first figure:

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Problem figures



Answer figures



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

Q84. Periyar National Park is in _____.

(a) Tamil Nadu
(b) Goa
(c) Karnataka
(d) Kerala

Q85. An element having atomic number 17 will resemble which of the following elements having Atomic number as given below?

(a) 35
(b) 18
(c) 34
(d) 33

Q86. Who among the following activists, associated with the Chipko Movement, is a Ramon Magsaysay Award winner ?

(a) Amrit Devi
(b) Sunderlal Baguguna
(c) Gaura Devi
(d) Chandi Prasad Bhatt

Q87. Find the greatest number which is such that when 76, 151, and 226 are divided by it, the remainders are all alike.

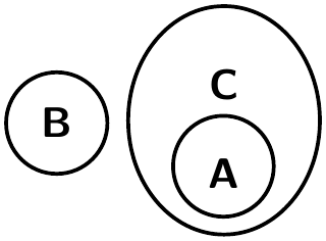
(a) 60
(b) 70
(c) 75
(d) 69

Q88. Which of the following Venn diagrams correctly represents the relationship between the following classes?

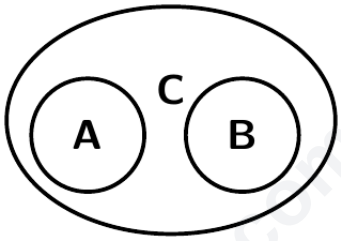
A) Electron
B) Proton
C) Atom

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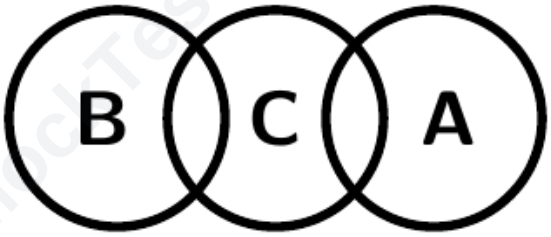
(a)



(b)



(c)



(d)



Q89. Find the person who does NOT belong to the group.

(a) Rakesh Sharma
(b) Kalpana Chawla
(c) Sunita Williams
(d) Mahendra Singh Dhoni

Q90. _____ is a true marine fish

(a) Jellyfish
(b) Starfish
(c) Silverfish
(d) Dogfish

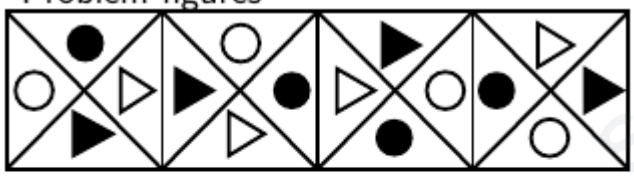
Q91. Select the lateral mirror image of REACH from the given options.

REACH	HƆVƎЯ	BENCH	HƆNƎB
A	B	C	D

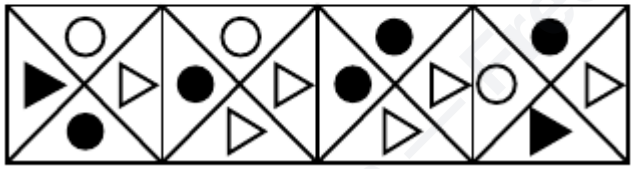
(a) B
(b) C
(c) A
(d) D

Q92. Select the answer figure that will come next in the given problem figure series.

Problem figures



Answer figures



A B C D

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

Q93. If 350 marbles are shared between Sita and Savita in the ratio 5 : 9, Savita will get _____ marbles.

(a) 250
(b) 200
(c) 225
(d) 125

Q94. Which movie won the Oscars for Best Picture in 2017 ?

(a) La La Land
(b) Moonlight
(c) Manchester by the Sea
(d) Spotlight

Q95. Find the odd figure out from among the given figures.



A B C D

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

Q96. Sound is produced by _____.

(a) vibrating objects
(b) moving objects
(c) talking people
(d) swinging bodies

Q97. Mehek goes for a stroll from her house. She starts walking facing the Sun at 6.00 am in the morning and walks 1 km straight. At a crossroads, she takes a right turn and then walks 1 km. finally, she take a U -turn and walks again for 1 km. how far is she from her home?

(a) 4 km

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(b) 2 km
(c) 3 km
(d) 1 km

Q98. The sides of parallelogram are 12 m and 17 m respectively. If one of the diagonals is 25 m long, the area of parallelogram is:
(a) 150 m^2
(b) 180 m2
(c) 160 m2
(d) 190 m2

Q99. Which of the following statements is true for metals ?
(a) Metals have 1 to 4 valence electrons in their outermost shell.
(b) Metals have 4 or more valence electrons in their outermost orbit.
(c) Metals have 1 to 3 valence electrons in their outermost orbit.
(d) Metals have 8 valence electrons in their outermost shell.

Q100. Pipe A can fill an empty cistern in 15 hours while pipe B takes 25 hours to fill it. Initially pipe A is left open for some time and then closed and Pipe B is switched on immediately. In all the cistern takes 21 hours to be full. How long was Pipe A open?
(a) 3 hours
(b) 9 hours
(c) 6 hours
(d) 7.5 hours

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) When the stone is completely submerged in the water in a beaker.

The correct answer is When the stone is completely submerged in the water in a beaker.

• The reading on spring balance will show the least weight when the stone is completely submerged in the water in a beaker.

Important Points

• Buoyant Force:

• When a body is immersed partly or wholly in a liquid, a force acts on the body by the liquid in the upward direction.

• This force is called buoyant force or force of buoyancy or upthrust.

• It is equal to the weight of the liquid displaced by the body and acts at the centre of gravity of the displaced liquid.

• Archimedes' Principle:

• When a body is immersed partly or wholly in a liquid, there is an apparent loss in the weight of the body which is equal to the weight of the liquid displaced by the body.

• Law of Floatation: A body floats in a liquid if

• The density of the material of the body is less than or equal to the density of the liquid.

• If the density of the material of the body is equal to the density of the liquid, the body floats fully submerged in liquid in neutral equilibrium.

• When the body floats in neutral equilibrium, the weight of the body is equal to the weight of displaced liquid.

• The centre of gravity of the body and the centre of gravity of the displaced liquid should be in one vertical line.

Q2. Answer: (d) 4

Shortcut Trick

To find factors that are perfect squares, look at the prime factorization: $2250 = 2^1 \times 3^2 \times 5^3$.

For a factor to be a perfect square, the power of each prime must be even (0, 2, 4...).

Available even powers: For 2: {0}; For 3: {0, 2}; For 5: {0, 2}.

Number of perfect square factors = 1 (from 2) × 2 (from 3) × 2 (from 5) = 4.

Therefore The correct answer is 4.

Alternate Method

Given: The number is 2250.

Calculations:

=> Prime factorization of 2250:

=> $2250 = 2 \times 1125 = 2 \times 3^2 \times 125 = 2^1 \times 3^2 \times 5^3$

=> Factors whose square roots are natural numbers are perfect squares.

=> A factor is a perfect square if the exponents in its prime factorization are even.

=> Even exponents for 2^1 are {0} (1 value).

=> Even exponents for 3^2 are {0, 2} (2 values).

=> Even exponents for 5^3 are {0, 2} (2 values).

=> Total perfect square factors = 1 × 2 × 2 = 4.

=> The factors are: 1, 9, 25, 225.

Therefore The correct answer is 4.

Additional Information

Number of Factors

If N = p^a × q^b × r^c, total factors = (a+1)(b+1)(c+1).

Perfect Square Factors

To find perfect square factors, take only even powers of prime bases: (floor(a/2)+1) × (floor(b/2)+1)...

Perfect Cube Factors

A factor is a perfect cube if the exponents are multiples of 3 (0, 3, 6...).

Q3. Answer: (b) Mithali Raj

The correct answer is Mithali Raj.

• Mithali Raj is the first Indian female cricketer to score 2000 runs in T20 International Cricket.

Key Points

• Mithali received the Arjuna award in 2013.

• She is the current test and ODI Captain of the women's national cricket team. (As of Dec 2022)

• Mithali Raj is the first Indian female cricketer to cross 5,000 ODI runs.

• She is famously known as the 'Lady Sachin'.

Additional Information

• Harmanpreet Kaur was awarded the Arjuna Award for Cricket in the year 2017.

• She became the first Indian cricketer to sign a deal with Brisbane Heat for the Women’s Big Bash League.

• Smriti Mandhana became the second Indian cricketer to sign a deal with Brisbane Heat for the Women’s Big Bash League.

• Poonam Raut set a world record opening partnership of 320 runs with Deepti Sharma and contributed 109.

Q4. Answer: (a) Statement 1 and 2 alone is sufficient

Shortcut Trick

Statement 1: 1/4 of 1 ball = 5 kg → 1 ball = 20 kg. (Sufficient)

Statement 2: (3 balls) − (2 balls) = 20 kg → 1 ball = 20 kg. (Sufficient)

Since both statements independently provide the weight of one ball, the weight of 10 balls can be calculated from either.

Therefore The correct answer is Statement 1 and 2 alone is sufficient.

Alternate Method

Given: 10 iron balls of equal weight.

Formula Used: Total Weight = Number of items × Weight per item

Let the weight of each ball be w kg.

From Statement 1:

=> w/4 = 5

=> w = 5 × 4 = 20 kg

=> Total weight of 10 balls = 10 × 20 = 200 kg

From Statement 2:

=> 3w = 2w + 20

=> 3w − 2w = 20

=> w = 20 kg

=> Total weight of 10 balls = 10 × 20 = 200 kg

Therefore The correct answer is Statement 1 and 2 alone is sufficient.

Additional Information

Data Sufficiency Logic

A statement is sufficient if it leads to a unique and definite answer to the question. If each statement provides the answer independently, the option "Each statement alone is sufficient" is chosen.

Unitary Method

It involves finding the value of a single unit (1 ball weight) first, and then multiplying that value by the required number of units (10 balls).

Linear Equations

Word problems can be translated into equations. For example, "X is 20 more than Y" is written as X = Y + 20.

Q5. Answer: (a) circum-centre

Shortcut Trick

The point of intersection of perpendicular bisectors of the sides of a triangle is the circum-centre.

Memory Aid for Triangle Centers:

1. Perpendicular Bisectors → Circum-centre (Center of circumcircle)

2. Altitudes → Orthocentre

3. Medians → Centroid

4. Angle Bisectors → In-center (Center of incircle)

Therefore The correct answer is circum-centre.

Alternate Method

Given: A triangle with its perpendicular bisectors intersecting at a common point.

Property Used: The circum-centre is the point that is equidistant from all three vertices of the triangle, allowing a circle (the circumcircle) to pass through them.

=> A perpendicular bisector is a line that divides a side into two equal parts and meets it at a 90° angle.

=> In any triangle, the three perpendicular bisectors are concurrent (they meet at a single point).

=> This point of concurrency is called the circum-centre.

=> The distance from the circum-centre to any vertex is the circum-radius (R).

Therefore The correct answer is circum-centre.

Additional Information

Orthocentre

The point where the three altitudes (perpendiculars drawn from vertices to opposite sides) of a triangle intersect.

Centroid

The point where the three medians (lines connecting vertices to the midpoints of opposite sides) intersect; it divides each median in a 2:1 ratio.

In-center

The point of intersection of the internal angle bisectors; it is the center of the incircle which touches all sides of the triangle.

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Euler Line

In any non-equilateral triangle, the orthocentre, centroid, and circum-centre are collinear, and the centroid divides the distance between the other two in a 2:1 ratio.

Q6. Answer: (b) 14 decimeter

Shortcut Trick

Apply the Pythagorean triplet: (7, 24, 25).

Scale the triplet by a factor of 2: (7×2, 24×2, 25×2) → (14, 48, 50).

Here, the hypotenuse is 50 (ladder) and one side is 48 (height).

The missing base distance must be 14.

Therefore The correct answer is 14 decimeter.

Alternate Method

Given:

Length of the ladder (Hypotenuse, h) = 50 decimeter

Height of the window (Perpendicular, p) = 48 decimeter

Formula Used:

Pythagoras Theorem: $h^2 = p^2 + b^2$

Calculations:

=> $50^2 = 48^2 + b^2$

=> $2500 = 2304 + b^2$

=> $b^2 = 2500 - 2304$

=> $b^2 = 196$

=> $b = \sqrt{196}$

=> b = 14 decimeter

Therefore The correct answer is 14 decimeter.

Additional Information

Pythagorean Triplets

Common sets of integers that satisfy $a^2 + b^2 = c^2$, such as (3, 4, 5), (5, 12, 13), (7, 24, 25), and (8, 15, 17).

Right-Angled Triangle Properties

The side opposite to the 90° angle is the hypotenuse, which is always the longest side of the triangle.

Scaling Rule

If (a, b, c) is a Pythagorean triplet, then (ka, kb, kc) is also a triplet for any positive integer k.

Q7. Answer: (b) The Mass of a body remains same while the Weight changes from place to place.

The correct answer is the Mas of a body remains same while the Weight changes from place to place.

Key Points

• Weight is not constant and it changes from place to place.

• It changes because it depends on the value of g.

• Variation in g:

• The value of g decreases with height or depth from the earth’s surface.

• g is maximum at poles.

• g is minimum at the equator.

• g decreases due to the rotation of the earth.

• g decreases if the angular speed of the earth increases and increases if the angular speed of the earth decreases.

• Mass is the quantity of matter contained in a body and is the measure of inertia.

• Mass value remains constants at all places but weight may change because weight of a body is the force with which a body is attracted towards the centre of the earth.

Q8. Answer: (a) Energy

The correct answer is Energy.

• Energy can neither be created nor be destroyed.

Key Points

• First Law of Thermodynamics:

• It is also known as the Law of Conservation of Energy and states that energy cannot be created or destroyed in an isolated system.

• Thermodynamics was discovered by Ludwig Boltzmann.

• Albert Einstein also said that "Energy cannot be created or destroyed. It can only be changed from one form to another."

Additional Information

• Force is that external cause which when acts on a body, changes or tries to change the initial state of the body.

• Force = mass × acceleration

• Its S.I. unit is Newton (kg. m s-2)

• Momentum is the property of a moving body and is defined as the product of mass and velocity of the body.

• It is a vector quantity.

• Its SI unit is kg m/s.

• The rate of doing work is called power.

• SI unit of power is watt or Joule Per second named as a respect to the scientist James Watt.

• It is a scalar quantity.

Q9. Answer: (c) 1.00 Ω

CONCEPT:

• Resistance (R): The resistance offered to the flow of current is known as the resistance.

• SI unit of resistance is the ohm (Ω).

• Mathematically resistance can be written as

=> R = (ρ l)/A

Where R = resistance, l = length, A = area of cross-section and ρ = resistivity

EXPLANATION:

• The wire is doubled on it means to fold the length of wire. That is its length will get half and the area of the cross-section will get doubled.

Given: R1 = R = 4 Ω

As we know that the resistance of the wire is,

=> R = (ρ l)/A

When the wire is doubled then, then its area will increase automatically. But the volume of the wire will be the same.

Therefore The volume of original wire = volume of new wire

=> A1l1 = A2l2

=> A1l1 = A2 l1/2

=> A2 = 2A1

• The resistance of the wire in 1st case

=> R1 = R = (ρ l1)/A1 ----(1)

• The resistance of the wire in 2nd case

=> R2 = (ρ l2)/A2 = (ρ l1/2)/2A1 = (ρ l1)/4A1 -----(2)

Divide equation 1 and 2, we get

=> R1/R2 = ((ρ l1)/A1)/((ρ l1)/4A1) = 4

=> R2 = 1 Ω

Q10. Answer: (c) Haryana

The correct answer is Haryana.

Key Points

• Sultanpur National Park was earlier known as Sultanpur Bird Sanctuary.

• Sultanpur National Park is in Haryana.

• The area was declared a Bird sanctuary in 1972.

• The Sultanpur Bird Sanctuary became a National Park in 1991.

• Sultanpur is named after the Rajput raja Sultan Singh Chauhan.

• The Kalesar National Park is also situated in Haryana.

Additional Information

State	National Park
Rajasthan	Sariska National Park, Keoladeo Ghana National Park, Ranthambore National Park
Delhi	------
Punjab	Abohar, Kathlaur Kushlian, Jhajjar Bachauli

Q11. Answer: (c) 20

In the above diagram there are many triangles as follows:

Total triangles: ABE, BEF, BFC, FCG, CGD, GDH, CKD, BID, BED, AED, BEI, EIF, IJF, CJK, GKD, EKG, EDG, EJF, CJD, EDH

Hence, there are 20 triangles.

Q12. Answer: (a) Rahul Shivshankar

The correct answer is Rahul Shivshankar.

• Rahul Shivshankar is the Chief Editor of the news channel Times Now.

Key Points

• Rahul Shivshankar was appointed as the chief editor of the leading English news channel Times Now.

• This is his second stint with the network after a gap of six years.

• Times Network is the broadcast arm of India's premier media house Bennett Coleman & Company Limited (BCCL).

Additional Information

• Arnab Goswami Editor-in-chief of Republic TV.

• Ravish Kumar is the Editor-in-chief of NDTV.

• Ravish Kumar has conferred the prestigious Ramon Magsaysay Award for "harnessing journalism to give voice to the voiceless" and his "unfaltering commitment to a professional, ethical journalism of the highest standards".

• Ravish Kumar is among the five recipients of the 2019 Magsaysay award, the Asian equivalent of the Nobel, which recognizes the "greatness of spirit and transformative leadership in Asia".

• Sonia Singh is the editorial director and president of the NDTV ethics committee.

Q13. Answer: (c) 17/8 hours

Shortcut Trick

Since Distance is constant, Speed is inversely proportional to Time (S1T1 = S2T2).

Ratio of Speeds (Jayant : Prabhu) = 54 : 72 = 3 : 4.

Ratio of Time taken = 4 : 3.

4 units = 2.5 hours => 1 unit = 2.5 ÷ 4 = 0.625 hours.

3 units = 3 × 0.625 = 1.875 hours = 1(7/8) hours.

Therefore The correct answer is 1(7/8) hr.

Alternate Method

Given:

Speed of Jayant (S1) = 54 km/h

Time taken by Jayant (T1) = 2(1/2) hours = 5/2 hours

Speed of Prabhu (S2) = 72 km/h

Formula Used:

Distance = Speed × Time

Calculations:

=> Distance = 54 × (5/2)

=> Distance = 27 × 5 = 135 km

=> Time taken by Prabhu = Distance ÷ Speed_(Prabhu)

=> Time = 135 ÷ 72

=> Time = 15/8 hours (Dividing both by 9)

=> Time = 1(7/8) hours

Therefore The correct answer is 1(7/8) hr.

Additional Information

Inverse Proportion Rule

When distance is constant, the ratio of speeds is the inverse of the ratio of time taken: S1/S2 = T2/T1.

Unit Conversion

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

Average Speed

If a person covers two equal distances at speeds x and y, the average speed = 2xy/(x + y).

Q14. Answer: (c) 16368

Shortcut Trick

The given series is a Geometric Progression (GP) where the first term a = 16 and the common ratio r = 2.

For a GP, the sum of n terms is given by S_n = a(rⁿ − 1) / (r − 1).

Here, S10 = 16(2^(10) − 1) / (2 − 1).

=> S10 = 16 × (1024 − 1) = 16 × 1023 = 16368.

Therefore The correct answer is 16368.

Alternate Method

Given: Series = 16, 32, 64, 128, ... up to 10 terms.

Formula Used: Sum of n terms of GP, S_n = a(rⁿ − 1) / (r − 1) where a is the first term and r is the common ratio.

16 ×2 → 32 ×2 → 64 ×2 → 128 ... → 16368

Calculations:

=> First term (a) = 16

=> Common ratio (r) = 32 ÷ 16 = 2

=> Number of terms (n) = 10

=> S10 = 16 × (2^(10) − 1) / (2 − 1)

=> S10 = 16 × (1024 − 1) / 1

=> S10 = 16 × 1023

=> S10 = 16368

Therefore The correct answer is 16368.

Additional Information

Geometric Progression (GP)

A sequence where each term is found by multiplying the previous term by a fixed, non-zero number called the common ratio (r).

General Term of GP

The n^(th) term is given by T_n = a × r^((n−1)).

Sum of Infinite GP

If |r| < 1, the sum of an infinite GP is S_∞ = a / (1 − r).

Q15. Answer: (d) NBOHP

CODING - All words are changed with next possible value in alphabetical order.

Means all alphabets are replaced by adding +1 in their place value.

Such as, TREE is coded as USFF

Hence, MANGO will be coded as

Hence, MANGO will be coded as NBOHP

Q16. Answer: (b) Japan

The correct answer is Japan.

Key Points

• The Sano Cricket Festival was organized by ICC in Japan in the year 2018.

• ICC organized the 'Sano Cricket Curry Festival' in the Japanese city of Sano to promote cricket in Japan.

• A cricket match between the Japanese cricket team and the Indian team was held at the event.

• The festival emphasized cultural events and food from cricket-playing nations like Bangladesh, India, Pakistan, Nepal and Sri Lanka.

• The “City of Cricket Sano” project started in the year 2008 and in the 10 years since then school programs have introduced the sport to thousands of children every year.

• The Japan Cricket Association was established in 1984 and was given Associate status by the ICC in 2005.

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Q17. Answer: (d) [figure]

Simple arrow is placed next to dark arrow in clockwise direction in all the three options but not in option 4.

Hence, option 4 is different from other than three.

Q18. Answer: (d) Uniform circular motion

The correct answer is Uniform circular motion.

• The motion of a body with constant speed in a circular path is called Uniform circular motion.

Key Points

• Circular motion

• When an object moves along a circular path, then its motion is called circular motion e.g., the motion of a top.

• If an object moves along a circular path with uniform speed, its motion is called uniform circular motion.

• It is accelerated even if the speed of the body is constant. The motion of a satellite is an accelerated motion.

Additional Information

• Oscillatory Motion:

• If a particle repeats its motion after a regular time interval about a fixed point, motion is said to be oscillatory or vibratory.

• The motion of a piston in an automobile engine and the motion of the balance wheel of a watch are examples of oscillatory motion.

• In a non-uniform circular motion, an object's motion is along a circle, but the speed is not constant.

Q19. Answer: (d) 3.5 cm

Shortcut Trick

Thickness of a circular ring = (Difference in Circumferences) ÷ 2π

Thickness = (44 − 22) ÷ (2 × 22/7)

Thickness = 22 ÷ (44/7) = 22 × 7 / 44 = 7/2 = 3.5 cm

Therefore The correct answer is 3.5 cm.

Alternate Method

Given:

Inner Circumference (C1) = 22 cm

Outer Circumference (C2) = 44 cm

Formula Used:

Circumference of a circle = 2πr

Thickness of ring = Outer Radius (R) − Inner Radius (r)

Calculations:

=> 2 × (22/7) × R = 44

=> R = (44 × 7) / 44 = 7 cm

=> 2 × (22/7) × r = 22

=> r = (22 × 7) / 44 = 3.5 cm

=> Thickness = R − r = 7 − 3.5 = 3.5 cm

Therefore The correct answer is 3.5 cm.

Additional Information

Area of a Circular Ring

Q20. Answer: (b) 1, 6; 2, 3; 5, 4

In 1^(st) and 6^(th) case both same figures are cutting partially each other, Hence this one of the pair.

In 2^(nd) and 3rd case both different figures are cutting partially each other, Hence this one of the pair.

In 4^(th) and 5^(th) case both are different figures and one figure is inside the other one, Hence this one of the pair.

Q21. Answer: (c) Both conclusions 1 and 2 follow

The least possible diagram for the given statements is as follows,

1) Some glasses are plates → True, as, all plates are glasses so some portion of glasses is Plates which is definitely true.

2) Some glasses are spoons → True, as some spoons are glasses then that which is also definitely true.

Hence, both conclusions 1 and 2 follow

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Q22. Answer: (d) equal and in the opposite direction

The correct answer is equal and in the opposite direction.

• The forces between the two bodies are always equal and in the opposite direction.

Key Points

• Force is that external cause which when acts on a body, changes or tries to change the initial state of the body.

• Force = mass × acceleration

• Its S.I. unit is Newton (kg. m s^(-2))

• Newton's Second Law of Motion:

• The rate of change of momentum of a body is directly proportional to the applied force on the body and takes place in the direction of the force.

• Newton's second law gives the magnitude of the force, i.e. Force = mass × acceleration.

• Newton's first law is contained in the second law.

Additional Information

• According to Newton's First Law of Motion- " If a body in a state of motion it remains in a state of motion and if a body in a state of rest it remains in the state of rest until and unless external force applied on it. This is also called as law of inertia.

• According to Newton's third law of motion- "Every action has an equal and opposite reaction".

• This law represents a certain symmetry in nature: forces always occur in pairs, and one body cannot exert a force on another without experiencing a force itself.

Q23. Answer: (a) 415 m

Shortcut Trick

Initial distance of the girl from the bird's base = Height × cot(45°) = 500 × 1 = 500 m.

Girl moves 50 m towards the bird, so new horizontal position relative to start = 500 − 50 = 450 m.

Final horizontal distance from girl to bird = Height × cot(30°) = 500 × 1.73 = 865 m.

Distance travelled by bird = 865 − 450 = 415 m.

Therefore The correct answer is 415 m.

Alternate Method

Given: Height (H) = 500 m, Initial angle (θ1) = 45°, Final angle (θ2) = 30°, Girl's movement = 50 m.

Formula Used: Distance = Height × cot(θ)

=> Let the initial position of the girl be A and the bird's base on ground be B.

=> AB = 500 × cot(45°) = 500 × 1 = 500 m.

=> Girl moves 50 m towards B to point C. So, CB = 500 − 50 = 450 m.

=> Let the bird fly to a new position such that its horizontal distance from C is D.

=> CD = 500 × cot(30°) = 500 × 1.73 = 865 m.

=> Distance travelled by bird = CD − CB = 865 − 450 = 415 m.

Therefore The correct answer is 415 m.

Additional Information

Angle of Elevation

The angle formed by the line of sight with the horizontal when looking up at an object. tan(θ) = Opposite / Adjacent.

Trigonometric Ratios

Standard values: cot(45°) = 1 and cot(30°) = √3 ≈ 1.732.

Horizontal Distance Calculation

When height is constant, Distance = Height × cot(θ). The bird flies horizontally, so the height remains 500 m.

Q24. Answer: (d) Worst

Deep is an antonym of Shallow,

Hence, 'Best' is an antonym of 'Worst'.

Q25. Answer: (c) Kesari

The correct answer is Kesari.

• Kesari was written by Lokmanya Tilak during the Indian National Movement.

Key Points

• Bal Gangadhar Tilak:

• He launched two newspapers–the Kesari (in Marathi) and the Maratha (in English).
• He organized Ganpati Festival (1893 AD) and Shivaji Festival (1895 AD).
• He was deported to Mandalay Jail (Burma) for writing seditious articles.
• He started the Home Rule League in 1916 AD.
• He wrote Gita Rahasya.
• Tilak asserted: 'Swaraj is my birthright and I shall have it'.
• He was awarded the title of Lokmanya.
• He was called 'Bal', Lala Lajpat Rai was called 'Lal' and Bipin Chandra Pal was called 'Pal'.
• He was a part of the trio of 'Lal-Bal- Pal'
• He wrote the books The Arctic Home of Vedas and Gita Rahasya.

Additional Information

• Yugantar Patrika was a Bengali newspaper founded in Calcutta by Barindra Kumar Ghosh, Abhinash Bhattacharya and Bhupendranath Dutt in the year 1906.
• The Bengalee newspaper was founded by Surendra Nath Banerjee.
• Amrita Bazar Patrika was founded by Sisir Kumar Ghosh and Motilal Ghosh.

Q26. Answer: (d) 1260

Shortcut Trick

LCM of numbers can be found by taking the highest powers of all prime factors involved.

$63 = 7 \times 9 = 3^2 \times 7^1$

$140 = 14 \times 10 = 2^2 \times 5^1 \times 7^1$

$LCM = 2^2 \times 3^2 \times 5^1 \times 7^1 = 4 \times 9 \times 5 \times 7 = 1260$

Therefore The correct answer is 1260.

Alternate Method

Given: Numbers are 63 and 140.

Formula Used: Product of two numbers = HCF × LCM

Step 1: Find HCF using prime factorization:

=> 63 = 3 × 3 × 7

=> 140 = 2 × 2 × 5 × 7

=> Common factor is 7, so HCF = 7

Step 2: Use the formula to find LCM:

=> LCM = (First Number × Second Number) ÷ HCF

=> LCM = (63 × 140) ÷ 7

=> LCM = 9 × 140

=> LCM = 1260

Therefore The correct answer is 1260.

Additional Information

LCM of Fractions

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

HCF of Fractions

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

Co-prime Numbers

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

Q27. Answer: (a) [figure]

Grapes and Pineapples both are fruits but both are different kinds of fruits so, 1^(st) Venn diagram follows.

Hence, Figure 1 is correct answer.

Q28. Answer: (b) 3/10

Given:

Initially amount of fuel in his vehicle = 192/7l,

Fuel consumed during journey = 131/2l

Concept Used:

In this type of question, to obtain the amount of fuel left, the difference of initial and consumed value is taken.

Formula Used: fraction of initial petrol = (amount of fuel left)/(initial amount of fuel present)

Calculation: using the above formulae, we get

Amount of fuel left = 192/7l - 131/2l

=> 511/14l

Therefore fraction of initial petrol

((81/14)/135)/7 = 3/10

Q29. Answer: (a) 69

Calculation:

From the given table we can say that,

The number of students scoring less than 60% marks aggregate i.e. 60% of 50 = 30 marks

=> total students - number of students scoring more than 60% marks or 30 marks aggregate

=> 100 – 31 = 69

Therefore The required number of students is 69

Q30. Answer: (c) 20000 Hz

The Correct Answer is 20000Hz.

Key Points

• The Ultrasonic sound has a frequency higher than 20000Hz.

• Ultrasound is sound waves with frequencies higher than the audible frequency.

• Humans cannot hear Ultrasonic Sound.

• Ultrasonic devices are used to detect objects and measure distances.

• Ultrasound imaging or sonography is often used in medicine.

• The frequency of audible sounds is usually 20-20,000 hertz

Additional Information

• Applications of Ultrasonic Waves:

• For sending signals.

• For measuring the depth of the sea.

• For cleaning clothes, airplanes, and machinery parts of clocks.

• For removing lamp-shoot from the chimney of factories.

• In sterilizing a liquid.

• In ultrasonography.

Q31. Answer: (d) plastics, ebonite, paper, cotton, Bakelite, dry air, rubber

The Correct Answer is plastics, ebonite, paper, cotton, Bakelite, dry air, rubber.

Key Points

• An insulator is a material that does not conduct electrical current.

• The vacuum is also an insulator but is not actually material.

• Most electrical conductors are covered by insulation.

• Magnet wire is coated with an extremely thin layer of insulation so that more turns or larger wire may be used in the winding of transformers.

• The insulator is a material in which the electron does not flow freely.

• The atom of the insulator has tightly bound electrons.

• Examples of insulators include plastics, paper, rubber, glass and bakelite.

Additional Information

• Condutor is opposite of Insulator.

• A Conductor is an object that allows the free flow of charge.

• Examples of Conductor includes silver, copper, gold, aluminum, iron.

Q32. Answer: (a) Rs. 720

Shortcut Trick

Loss of 4% means the Selling Price (SP) is 96% of the Cost Price (CP).

Multiplier for SP = CP × (100 − Loss%) ÷ 100

SP = 750 × (96 ÷ 100) = 750 × 0.96

SP = 720

Therefore The correct answer is Rs. 720.

Alternate Method

Given:

Cost Price (CP) of the table = Rs. 750

Loss Percentage = 4%

Formulas:

Loss = (Loss% ÷ 100) × CP

Selling Price (SP) = CP − Loss

Steps:

=> Loss amount = (4 ÷ 100) × 750

=> Loss amount = 0.04 × 750 = 30

=> SP = CP − Loss

=> SP = 750 − 30 = 720

Therefore The correct answer is Rs. 720.

Additional Information

Cost Price and Selling Price

The price at which an article is purchased is called its Cost Price (CP), and the price at which it is sold is called its Selling Price (SP).

Loss Calculation

When SP < CP, the seller incurs a loss. Loss = CP − SP. Loss percentage is always calculated on the CP unless otherwise stated.

Q33. Answer: (c) 6/5

Concept Used:

This type of question can be solved by the help of BODMAS

Calculation:

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

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

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

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

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

Now,

using BODMAS, we get

=> (1 + 2)/({1 + 2/((4/3))})

=> (1 + 2)/({1 + 3/2})

=> (1 + 2)/({5/2})

=> 6/5

Q34. Answer: (a) 2x + y/2 = 1

Shortcut Trick

Check the y-intercept by substituting x = 0 into the given options.

The y-intercept is 2, so the equation must satisfy the point (0, 2).

Option (1): 2(0) + 2/2 = 1 => 1 = 1 (Satisfied).

Option (2): 2(0) + 2/3 ≠ 1.

Option (3): 2(0) + 2 ≠ 1.

Option (4): 2(0) + 2/4 ≠ 1.

Therefore The correct answer is 2x + y/2 = 1.

Alternate Method

Given: Slope (m) = −4 and y-intercept (c) = 2.

Formula: The slope-intercept form of a line is y = mx + c.

Calculations:

=> y = (−4)x + 2

=> y = −4x + 2

=> 4x + y = 2

=> To match the options, divide the entire equation by 2:

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

=> 2x + y/2 = 1

Therefore The correct answer is 2x + y/2 = 1.

Additional Information

Slope-Intercept Form

The equation y = mx + c represents a line with slope m and y-intercept c.

Intercept Form

The equation x/a + y/b = 1 represents

Q35. Answer: (c) The Chief Justice of India

The correct answer is the Chief Justice of India.

• The Chief Justice of India conducts the Oath of Office for the President of India.

Key Points

• Article 60: Oath and Affirmation of the President.

• The oath of the President is administered by the Chief Justice of India and in his absence, the seniormost Judge of the Supreme Court.

• The Electoral College for the president consists of:

• The elected members of both Houses of Parliament;

• The elected members of the Legislative Assemblies of the states; and

• The elected members of the Legislative Assemblies of Union Territories of Delhi and Pondicherry (now Puducherry).

• Qualification of the President:

• Under Article 58, a person to be eligible for election as President should fulfill the following qualifications:

• He should be a citizen of India.

• He should have completed 35 years of age.

• He should be qualified for election as a member of the Lok Sabha.

• He should not hold any office of profit under the Union Government or any State Government or any local authority or any other public authority.

Additional Information

• The President conducts the Oath of Office for the Prime Minister of India.

• The Attorney General of India is appointed by the President.

• The President conducts the Oath of Office for the Vice President of India.

Q36. Answer: (c) Probably true or false

Nitrogen is a gas is a true but it is not confirmed that in the chamber that gas is Nitrogen. So, there is possibility case.

So option 3 is correct.

Q37. Answer: (d) 43

Concept Used: this type of question can be solved by the help of BODMAS

Calculation: using BODMAS, we get,

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

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

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

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

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

Now,

(- 45 + 7 × 23 – (247 ÷ 13) – 11) ÷ 2

=> (- 45 + 7 × 23 – 19 – 11) ÷ 2

=> (- 45 + 161 – 19 – 11) ÷ 2

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=> (- 75 + 161) ÷ 2

=> 86/2

=> 43

Q38. Answer: (d) -5/11

Shortcut Trick

Apply difference of squares: $a^2 - b^2 = (a - b)(a + b)$

Numerator = $(3 - 8)(3 + 8) = -5 \times 11$

Denominator = $(3 + 8)^2 = 11 \times 11$

Simplified Fraction = $(-5 \times 11) / (11 \times 11) = -5/11$

Therefore The correct answer is −5/11.

Alternate Method

Given: Equation $(3^2 - 8^2) / (3 + 8)^2$

Formula Used: $a^2 - b^2 = (a - b)(a + b)$ and $(a + b)^2 = a^2 + 2ab + b^2$

=> Numerator = $3^2 - 8^2 = 9 - 64$

=> Numerator = −55

=> Denominator = $(3 + 8)^2 = (11)^2$

=> Denominator = 121

=> Result = −55 / 121

=> Result = $(-5 \times 11) / (11 \times 11) = -5 / 11$

Therefore The correct answer is −5/11.

Additional Information

Algebraic Identity

The difference of squares formula $a^2 - b^2 = (a + b)(a - b)$ is useful for simplifying fractions where one factor can be cancelled from the denominator.

Square of a Sum

The identity $(a + b)^2 = a^2 + 2ab + b^2$ is fundamental, but for numerical simplification, adding the numbers inside the bracket first is usually faster.

BODMAS Rule

Always prioritize terms inside Brackets (B) and Orders (O/Exponents) before performing division or multiplication.

Q39. Answer: (c) AMRIT (Affordable Medicine and Reliable Implants for Treatment)

The correct answer is AMRIT (Affordable Medicine and Reliable Implants for Treatment).

Key Points

• AMRIT stands for affordable Medicine and Reliable Implants for Treatment.

• The first AMRIT center was launched at All India Institute of Medical Sciences (AIIMS), New Delhi on November 15, 2015.

• It was launched by the Indian Government to reduce expenditure by patients on the treatment of cancer and cardiovascular diseases to make health care affordable for the needy.

• AMRIT retail pharmacy network offers more than 5200 drugs, implants, surgical disposables and other consumables at average discounts up to 60% of Maximum Retail Price (MRP).

• The Ministry for Health & Family Welfare launched the Affordable Medicines and Reliable Implants for Treatment (AMRIT) program.

• The beneficiaries are patients suffering from cancer and heart diseases (non-communicable diseases).

• The retail outlets in the name of AMRIT pharmacy are opened to sell drugs for cancer and heart diseases at highly discounted rates on market rates.

• The project is implemented by center-owned HLL Lifecare Ltd (HLL) which is deputed to establish and run the AMRIT chain of pharmacies across the country.

Q40. Answer: (b) 1.8

Shortcut Trick

Total work = LCM of 4 and 9 = 36 units.

Efficiency of (A + B + C) = 36 ÷ 4 = 9 units/hr.

Efficiency of (A + B) = 36 ÷ 9 = 4 units/hr.

Efficiency of C = 9 − 4 = 5 units/hr.

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Work done in 3 hours = 9 × 3 = 27 units. Remaining work = 36 − 27 = 9 units.

Time for C = 9 ÷ 5 = 1.8 hours.

Therefore The correct answer is 1.8 hours.

Alternate Method

Given: Time taken by (A+B+C) = 4 hours; Time taken by (A+B) = 9 hours.

Formula Used: Efficiency = Total Work ÷ Time

Pipes	Hours	Total Work	Efficiency
A + B + C	4	36	9
A + B	9	4	

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

=> Efficiency of C = 9 − 4 = 5 units/hr.

=> Work completed by all three pipes in 3 hours = 9 × 3 = 27 units.

=> Remaining work to be filled = 36 − 27 = 9 units.

=> Time taken by C alone to fill the remaining part = 9 ÷ 5

=> Time = 1.8 hours.

Therefore The correct answer is 1.8 hours.

Additional Information

Pipes & Cisterns Work Logic

The capacity of the tank is treated as Total Work, and the rate of filling is Efficiency. If a pipe empties, its efficiency is taken as negative.

Efficiency Subtraction Rule

Efficiency of an individual pipe can be found by subtracting the combined efficiency of others from the total group efficiency: Eff(C) = Eff(Total) − Eff(A+B).

Time Calculation

Time = Remaining Work ÷ Efficiency of the pipe(s) working on that portion.

Q41. Answer: (d) Potassium

The correct answer is Potassium.

• Potassium is an example of a metal that needs to be stored under oil.

Key Points

• Potassium (K) is a highly reactive metal and reacts vigorously with air and water.

• A large amount of heat is produced in their reaction.

• To avoid such accidents this metal is kept immersed in kerosene oil.

• Potassium undergoes a reaction with water similar to that of sodium; the products of the reaction are potassium hydroxide and hydrogen gas.

• This reaction releases a great deal of heat energy, often igniting the hydrogen gas that is produced.

• Sodium (Na) and Lithium (Li) are also very reactive to air and water and need to be stored under oil to prevent them from reacting with gases in the air and water.

• Caesium (Cs) is the most reactive of all metals.

Additional Information

• Uses of Potassium:

• Potash glass or hard glass contains potassium. It is used for making chemical apparatus: beakers, flasks, funnel.

• It is used as fertilizer, in gun powder, in matchsticks.

• Lithium is a soft, silvery metal, with a very low density, which reacts vigorously with water, and quickly tarnishes in air.

• Iron (Fe) is a chemical element, the metal of Group 8 (VIIIb) of the periodic table.

• Silver is a chemical element with the symbol Ag.

• The most electrically conductive element is silver, followed by copper and gold.

Q42. Answer: (a) Only argument 1 is strong

1^(st) argument is strong because it is true that outdoor games keeps children physically and mentally fit.

2^(nd) argument is weak because it is not necessary that every computer and mobile games are entertaining than outdoor games.

Hence, only argument 1 is strong.

Q43. Answer: (c) Sachin Tendulkar

The correct answer is Sachin Tendulkar.

Key Points

• 'A Billion Dreams' is a 2017 Indian docudrama-biographical film based on the life of Sachin Tendulkar.

• The film 'A Billion Dreams' is a documentary on the life of Indian cricketer Sachin Tendulkar.

• The docudrama-biographical film was Directed by James Erskine.

• Playing It My Way is the autobiography of Sachin Tendulkar.

• He is the only player who has 40 wickets and more than 11000 runs in Tests.

Additional Information

• Sunny Days: Sunil Gavaskar's Own Story is the autobiography of Sunil Gavaskar.

• Captain Cool: M S Dhoni is a book written by Gulu Ezekiel on M.S. Dhoni.

Important Points

• Indian cricket team's batting mainstay Virat Kohli was appointed as the new brand ambassador of the country's second-largest paramilitary force BSF.

• The 'Man of the Series' award in the three-match ODI series played between India and Australia in January 2020 is Virat Kohli.

• Virat Kohli was the ICC Test Cricketer of the Year 2018 and ICC ODI Cricketer of the Year 2018.

• Virat Kohli was also awarded the Sir Garfield Sobers Trophy for Cricketer of the Year.

Q44. Answer: (b) 55

Shortcut Trick

Let the ratio units be 5 and 6.

HCF = LCM ÷ (Product of ratio units) = 150 ÷ (5 × 6) = 150 ÷ 30 = 5.

Sum of numbers = (Sum of ratio units) × HCF = (5 + 6) × 5 = 11 × 5 = 55.

Therefore The correct answer is 55.

Alternate Method

Given:

Ratio of numbers = 5 : 6

LCM (Least Common Multiple) = 150

Calculations:

=> Let the two numbers be 5x and 6x, where x is the HCF.

=> LCM of 5x and 6x = 5 × 6 × x = 30x

=> 30x = 150

=> x = 150 ÷ 30 = 5

=> First number = 5 × 5 = 25

=> Second number = 6 × 5 = 30

=> Sum = 25 + 30 = 55

Therefore The correct answer is 55.

Additional Information

Product Rule

For any two numbers A and B, Product of numbers (A × B) = HCF × LCM.

Ratio and LCM

If the ratio of two numbers is a : b, then LCM = HCF × a × b.

Co-prime Numbers

If two numbers are co-prime (HCF = 1), their LCM is simply the product of the numbers.

Q45. Answer: (a) Ammonium chloride

The correct answer is Ammonium chloride.

• Ammonium chloride can undergo sublimation, when it is heated, the substance undergoes changes from solid to gas. The gas contains molecules such as ammonia and hydrogen chloride.

Key Points

• Sublimation:

• Sublimation is the process of conversion of a solid directly into vapor.

• Sublimation takes place when the boiling point is less than the melting point.

• Sublimation is shown by camphor or ice in a vacuum and Ammonium chloride.

• Hoar Frost:

• Hoar frost is just the reverse process of sublimation i.e. it is the process of direct conversion of vapour into solid.

• Steam produces more severe burns than water at the same temperature because the internal energy of steam is more than that of water at the same temperature.

Additional Information

• Ammonium sulfate is used as a wood preservative and manufacturing of sulphur.

• Ammonium phosphate is used in the manufacturing of fertilizer.

• Ammonium chlorate is a very unstable salt and is mainly used to manufacture explosives.

Q46. Answer: (a) 300 km

Shortcut Trick

Distance (D) = [S × (S + s1) / s1] × t1 = [S × (S − s2) / s2] × t2

[(S + 10) / 10] × 90 = [(S − 10) / 10] × 150

3S + 30 = 5S − 50 => 2S = 80 => S = 40 km/h

D = [40 × (40 + 10) / 10] × (90/60) = 4 × 50 × 1.5 = 300 km

Therefore The correct answer is 300 km.

Alternate Method

Given: Increase in speed (s1) = 10 km/h, Time saved (t1) = 90 min = 1.5 h

Decrease in speed (s2) = 10 km/h, Time extra (t2) = 150 min = 2.5 h

Formula: D = v1v2 / (v1 − v2) × Δt

=> D = [S(S + 10) / 10] × 1.5 --- (i)

=> D = [S(S − 10) / 10] × 2.5 --- (ii)

=> [S(S + 10) / 10] × 1.5 = [S(S − 10) / 10] × 2.5

=> 1.5(S + 10) = 2.5(S − 10)

=> 1.5S + 15 = 2.5S − 25

=> S = 40 km/h

=> D = [40 × (40 + 10) / 10] × 1.5 = 300 km

Therefore The correct answer is 300 km.

Additional Information

Constant Distance Property

When distance is constant, speed is inversely proportional to time (S prop. to 1/T). Ratio of speeds S1:S2 = T2:T1.

Average Speed Formula

For a round trip with speeds x and y, Average Speed = 2xy / (x + y). This is the harmonic mean of speeds.

Unit Conversion

To convert km/h to m/s, multiply by 5/18. To convert minutes to hours, divide by 60.

Q47. Answer: (b) Calcutta

The correct answer is Calcutta.

• In 1781, Warren Hastings, the first Governor-General of India set up a Madrassa in Calcutta for the study and teaching of Muslim law.

Key Points

• In September 1780, a delegation of Calcutta Muslim presented petitions to him to establish a madrasa for the instruction of young Muslims.

• After the establishment of the Calcutta Madrasa under the control of the Maulavi Muiz-ud-din launched education with ninety students.

• Developments under Warren Hastings (1774 AD-1785 AD):

• He became Governor of Bengal in 1772 AD and first Governor-General of Bengal in 1773 AD, through the Regulating Act.

• Established India’s first Supreme Court in Calcutta.

• He founded the Asiatic Society of Bengal with William Jones in 1784 AD and wrote the introduction to the first English translation of the Gita by Charles Wilkins.

• A translation of the code in Sanskrit appeared under the title ‘Code of Gentoo laws’.

• First Anglo-Maratha War during his period, which ended with the Treaty of Salbai (1776 AD-1776 AD).

• The second Anglo-Mysore War (1780 AD-1784 AD) ended with the Treaty of Mangalore.
• Rohilla War in 1774 AD.
• Pitt's India Act, 1784.
• Revenue Reforms: Divided Bengal into districts and appointed Collectors other revenue officials.

Additional Information

• Warren Hastings ended the dual system of government in 1772 AD.

Q48. Answer: (a) zero

The correct answer is zero.

• Equal forces acting in opposite directions are called balanced forces.
• Balanced forces acting on an object will not change the object's motion.
• When you add equal forces in opposite directions, the net force is zero.

Key Points

• Force and Motion A force is a push or a pull.
• Forces are described not only by how strong they are but also by the direction in which they act.
• The strength of a force is measured using a unit called the Newton (N).
• Unbalanced forces cause an object to start moving, stop moving, or change direction.
• The three main forces that stop moving objects are friction, gravity and wind resistance.

Q49. Answer: (b) 13

Shortcut Trick

Identify the frequency of meeting by calculating the LCM of individual intervals: 3, 5, 2, and 6.

LCM(3, 5, 2, 6) => 3 × 5 × 2 = 30 days.

Number of occurrences in 365 days = (365 ÷ 30) + 1 (including the start day).

Occurrences = 12.16 + 1 ≈ 12 + 1 = 13 times.

Therefore The correct answer is 13 times.

Alternate Method

Given: Intervals of visits are 3 days, 5 days, 2 days, and 6 days. Total duration is 1 year (365 days).

Formula Used: Common interval = LCM of individual intervals; Total visits = (Total Time ÷ LCM) + 1 (if counting includes the starting day).

Calculations:

=> Prime factors: $3 = 3^1$, $5 = 5^1$, $2 = 2^1$, $6 = 2^1 \times 3^1$

=> LCM = $2^1 \times 3^1 \times 5^1 = 30$ days

=> This means they meet every 30 days.

=> Since counting is done from the start of the year, the first visit occurs on Day 0.

=> Subsequent visits occur at: 30, 60, 90, 120, 150, 180, 210, 240, 270, 300, 330, and 360 days.

=> Total visits = 1 (at start) + 12 (every 30 days) = 13.

Therefore The correct answer is 13 times.

Additional Information

LCM (Least Common Multiple)

The smallest positive integer that is divisible by all numbers in a given set. Used for periodic meeting problems.

Interval Counting Rule

If the first event is included at t=0, the total number of events = (Total Duration ÷ Interval) + 1.

Bell Ringing Problems

Similar to garden visits, for bells tolling at different intervals, use LCM to find the common tolling time.

Q50. Answer: (b) To build bridges on national highways

The Correct Answer is To build bridges on national highways.

Key Points

• Setu Bharatam program was launched by Prime Minister Narendra Modi on 4 March 2016.
• Its aim is to make all national highways free of railway crossings by 2019 covers the construction of 208 rails over and under bridges.
• The Indian Bridge Management System has been introduced to map all 1,50,000 bridges in the country.

• Setu Bharatam program for building bridges for safe and seamless travel on National Highways, in New Delhi.

• The Ministry of Road Transport & Highways has also established an Indian Bridge Management System (IBMS) at the Indian Academy for Highway Engineer in Noida, U.P.

Additional Information

• The Ministry of Road Transport & Highways has also established an Indian Bridge Management System (IBMS) at the Indian Academy for Highway Engineer.

• INR 19,000 crore has been allocated for the Pradhan Mantri Gram Sadak Yojana (PMGSY).

Q51. Answer: (b) 31/2hours

Shortcut Trick

When two objects move towards each other, their Relative Speed is the sum of their individual speeds.

Relative Speed = 40 + 30 = 70 km/h

Time to meet = Total Distance ÷ Relative Speed = 245 ÷ 70 = 3.5 hours

Therefore The correct answer is 3(1)/(2) hr.

Alternate Method

Given:

Distance (D) = 245 km

Speed of car 1 (S1) = 40 km/h

Speed of car 2 (S2) = 30 km/h

Formula Used:

Time (T) = Distance ÷ Relative Speed

Calculations:

=> Relative Speed (Opposite Direction) = S1 + S2

=> Relative Speed = 40 + 30 = 70 km/h

=> Time taken to meet = 245 ÷ 70

=> Time taken to meet = 35/10 = 7/2 hours

=> Time taken to meet = 3(1)/(2) hours

Therefore The correct answer is 3(1)/(2) hr.

Additional Information

Relative Speed Concept

If two objects move in opposite directions, relative speed is S1 + S2. If they move in the same direction, relative speed is |S1 − S2|.

Average Speed

Average Speed for equal distances covered at different speeds S1 and S2 is given by 2 × S1 × S2 ÷ (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.

Q52. Answer: (d) Television industry

The correct answer is the Television industry.

Key Points

• The Emmy Awards, seen in the news, are presented for excellence in the Television industry.

• The Emmy award is an annual award honouring the best in U.S. prime time TV programs.

• The awards are chosen by the Academy of Television Arts & Sciences.

• The 72nd Primetime Emmy Awards of 2020 were held virtually due to the COVID 19 pandemic situation.

• The 2019 Emmy awards were the 71st Primetime Emmy Awards which were held at the Microsoft Theater in Downtown Los Angeles, California, US.

• The award was started in 1949.

Additional Information

• Grammy Awards are given in the field of music presented by the Recording Academy to recognize achievements in the music industry.

• The Grammys held for the first time on May 4, 1959.

• Booker Prize is a prestigious British award given annually in the literature to a full-length novel in English.

• The prize was first awarded in 1969.

Q53. Answer: (a) Ammeter : Current

The pattern followed is,

Barometer is an instrument used to measure pressure.

Similarly,

Option 1 → Ammeter is an instrument used to measure current in a circuit.

Option 2 → Scale is an instrument used to measure distance.

Option 3 → Thermometer is an instrument used to measure temperature.

Option 4 → Voltmeter is an instrument used to measure electrical potential difference between to points in an electric circuit.

'Ammeter: Current' share the same relationship as that shared by the given pair of words.

Hence, "Ammeter: Current" is the correct answer.

Q54. Answer: (b) Only assumption 2 is implicit

In 1^(st) assumption it says that I am a chef which is contradictory because if he is chef then why he want to become a chef.

In 2^(nd) assumption it says that I am not a chef which is true because his desire to become a chef but at present he is not a chef.

So, only assumption 2 is implicit.

Q55. Answer: (b) 18 elements

The correct answer is 18 elements.

Important Points

• The 4th and 5th-period contains 18 elemets each.

• The first period is the shortest period containing only 2 elements.

• The second and third periods are short periods.

• The population of each short period is eight elements.

• The sixth period is the longest and contains 32 elements in it.

• The seventh period is an incomplete period.

Key Points

• The Father of the Periodic Table is Mendeleev.

• Periodic Table is a tabular display of the chemical elements, organized on the basis of their properties.

• Mendeleev's Periodic Table (1869):

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

• Modern Periodic Law: Modern periodic law was given by Moseley.

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

• Modern Periodic Table is just a graphical representation of the Aufbau principle.

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

• Modern periodic table is classified as:

• s-block;

• p-block;

• d-block;

• f-block.

Q56. Answer: (a) National Urban Livelihood Mission

The correct answer is the National Urban Livelihood Mission.

• Deen Dayal Upadhyaya Antyodaya Yojana is also known as National Urban Livelihood Mission.

• https://www.india.gov.in/spotlight/deen-dayal-antyodaya-yojana

Key Points

• Deen Dayal Upadhyaya Antyodaya-National Urban Livelihood Mission:

• It is a flagship program of the Ministry of Housing and Urban affairs.

• The Government of India has provisioned Rs.500 crore for the scheme.

• The scheme is an integration of the National Urban Livelihoods Mission (NULM) and National Rural Livelihoods Mission (NRLM).

• The scheme in Hindi is known as - Rashtriya Shahri Aajeevika Mission.

Additional Information

• The National Rural Health Mission and the National Urban Health Mission was launched in April 2005,

• The National Health Mission was launched in 2013.
• It was made by subsuming the National Rural Health Mission and the National Urban Health Mission.
• National Rural Livelihood Mission was launched in the year 2011.

Q57. Answer: (c) Statements 1 and 2 together are sufficient.

The code for 'give' is 'De'.

Hence, Statements 1 and 2 together are required to tell the answer.

Q58. Answer: (c) 1858

The correct answer is 1858.

• Rani Lakshmi Bai died in the year 1858 while fighting the British.

Key Points

• Rani Lakshmi Bai was the leader of the Revolt of 1857 from Jhansi.
• Rani Laxmi Bai, nicknamed Manu was married to Raja Gangadhar Rao in 1842. The couple adopted a child in 1853 but Lord Dalhousie wished to annex Jhansi under the Doctrine of Lapse.
• Rani did not surrender and died fighting at Kalpi near Jhansi during the revolt of 1857.
• Jhansi was captured by Hugh Rose on June 17, 1858 AD.
• On June 17, 1858, Rani Lakshmi Bai died in the battlefield while fighting the British at Gwalior.

Important Points

• The doctrine of Lapse captured Satara (1848 AD), Jaitpur and Sambalpur (1849 AD), Baghat (1850 AD), Udaipur (1852 AD), Jhansi (1853 AD), and Nagpur (1854 AD).

Q59. Answer: (d) Blood

The correct answer is Blood.

• Fibers are absent in blood.

Key Points

• Human Blood:
• The quantity of blood in the human’s body is 7% of the total weight.
• Blood is fluid connective tissue and composed of blood corpuscles, plasma and platelets.
• It is slightly alkaline in nature (pH 7.4).
• Blood Consists of Two Parts:
• (A) Plasma; and (B) Blood corpuscles.
• Plasma: This is the liquid part of blood. 60% of the blood is plasma.
• Its 90% part is water, 7% protein, 0.9% salt and 0.1% is glucose.
• The function of plasma: Transportation of digested food, hormones, excretory product, etc. from the body takes place through plasma.
• Blood corpuscles: This is the remaining 40% part of the blood.
• Red Blood Corpuscles (RBC): Red Blood Corpuscles (RBC) in a mammal is biconcave.
• White Blood Corpuscles (WBC) or Leucocytes: Its formation takes place in Bone marrow, lymph node and sometimes in the liver and spleen.

Q60. Answer: (c) 8%

Shortcut Trick

Interest for 1 year = 372 ÷ 6 = Rs. 62

Rate % = (Interest per year ÷ Principal) × 100

Rate % = (62 ÷ 775) × 100 = 8%

Therefore The correct answer is 8%.

Alternate Method

Given:

Principal (P) = Rs. 775

Time (T) = 6 years

Simple Interest (SI) = Rs. 372

Formula Used:

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

Calculations:

=> 372 = (775 × R × 6) ÷ 100

=> 372 = (4650 × R) ÷ 100

=> 372 = 46.5 × R

=> R = 372 ÷ 46.5

=> R = 8%

Therefore The correct answer is 8%.

Additional Information

Amount Formula

The total sum payable after adding interest is Amount (A) = Principal (P) + Simple Interest (SI).

Finding Principal or Time

Principal (P) = (SI × 100) ÷ (R × T) and Time (T) = (SI × 100) ÷ (P × R).

Monthly Interest Conversion

If time is given in months (m), then Time (T) in the formula should be m ÷ 12 years.

Q61. Answer: (a) (- 11)/9

Concept Used:

this type of question can be solved by the help of BODMAS

Calculation:

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

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

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

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

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

Now,

Using BODMAS, we get

=> 11 ÷ 3 + 1/9 - 5 × 1

=> (34 – 45)/9

=> (- 11)/9

Q62. Answer: (b) BJP

The correct answer is BJP.

• The political party that won the majority of seats in the 2017 Uttarakhand Legislative Assembly Elections is BJP.

Key Points

• The 2017 Uttarakhand Legislative Assembly Elections were the 4th Vidhan Sabha election of the state.

• It was conducted in a single phase for the 69 seats of the Uttarakhand Legislative Assembly.

• Trivendra Singh Rawat was the leader and the Chief Minister of the state back then.

Additional Information

• The BJP was earlier known as the Bharatiya Jana Sangh which was formed in 1951 by Syama Prasad Mukherjee.

• After the Emergency of 1977, the Jana Sangh merged with several other parties to form the Janata Party.

Q63. Answer: (a) North

From the given information,

If she is now in West direction facing then according to above condition which is given in question, she must be facing north direction before crossing the road.

Q64. Answer: (d) Dilution

The correct answer is Dilution.

• Mixing an acid with water that results in a decrease in the concentration of ions per unit volume called dilution.

Key Points

• Dilution is the process of addition of solvent, which decreases the concentration of the solute in the solution.

• In both dilution and concentration, the amount of solute stays the same.

• The solute is a substance that is added to a solvent to form a solution.

• A solvent is a substance that dissolves the solute particles during the formation of a solution.

Additional Information

• Concentration is the process of removal of the solvent, which increases the concentration of the solute in the solution.

• Acidification is a process of controlling the growth of undesirable microorganisms, including pathogens.

• The mixing of both an acid and a base is called neutralization.

Q65. Answer: (a) 125

Shortcut Trick

The series consists of consecutive natural numbers raised to the power of 3 (cubes).

Pattern: 1^3, 2^3, 3^3, 4^3, 5^3, 6^3, 7^3

Calculation: 5 × 5 × 5 = 125

Therefore The correct answer is 125.

Alternate Method

Given Series: 1, 8, 27, 64, ?, 216, 343

1

1^3

→

8

2^3

→

27

3^3

→

64

4^3

→

125

5^3

→

216

6^3

→

343

The logic follows n^3 where n starts from 1.

=> $1^3 = 1$

=> $2^3 = 8$

=> $3^3 = 27$

=> $4^3 = 64$

=> $5^3 = 125$

=> $6^3 = 216$

=> $7^3 = 343$

Therefore The correct answer is 125.

Additional Information

Cube Series

A series where each term is the cube of natural numbers: n^3. Common cubes to memorize: 1-1, 8-2, 27-3, 64-4, 125-5, 216-6, 343-7, 512-8, 729-9, 1000-10.

Square Series

Similar logic applies to squares (n^2) such as 1, 4, 9, 16, 25, etc.

Mixed Power Series

Series may follow patterns like $n^3 + 1$ or $n^3 - n$. Always check the proximity of terms to standard cubes or squares.

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Q66. Answer: (a) Solar farming

The correct answer is Solar farming.

• The KUSUM Scheme promote Solar farming.

Key Points

• The Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyaan (PM-KUSUM) is a scheme for the promotion of solar energy.

• It was launched in the year 2020.

• It comes under the aegis of the Union Ministry of New and Renewable Energy (MNRE).

• It aims to add solar and other renewable capacities of 25,750 MW by 2022 with the total central financial support of Rs. 34,422 Crore.

• The Scheme consists of three components:

• Component A: 10,000 MW of Decentralized Ground Mounted Grid Connected Renewable Power Plants of individual plant size up to 2 MW.

• Component B: Installation of 17.50 lakh standalone Solar Powered Agriculture Pumps of individual pump capacity up to 7.5 HP.

• Component C: Solarisation of 10 Lakh Grid-connected Agriculture Pumps of individual pump capacity up to 7.5 HP.

Q67. Answer: (c) 52.5°

Shortcut Trick

The supplement of any angle is always 90° more than its complement (C).

So, C + 90° = 3C + 15°

=> 2C = 75° => C = 37.5°

The required angle is 90° − C = 90° − 37.5° = 52.5°

Therefore The correct answer is 52.5°.

Alternate Method

Given:

The supplement of an angle is 15° more than three times its complement.

Formula Used:

Complement of an angle x = 90° − x

Supplement of an angle x = 180° − x

x°

90° − x°

180° − x°

O

Calculation:

=> 180° − x = 3 × (90° − x) + 15°

=> 180° − x = 270° − 3x + 15°

=> 180° − x = 285° − 3x

=> 3x − x = 285° − 180°

=> 2x = 105°

=> x = 52.5°

Therefore The correct answer is 52.5°.

Additional Information

Complementary Angles

Two angles are complementary if their sum is exactly 90°. If one angle is θ, its complement is 90° − θ.

Supplementary Angles

Two angles are supplementary if their sum is exactly 180°. If one angle is θ, its supplement is 180° − θ.

Difference Between Supplement and Complement

For any given angle, the difference between its supplement and its complement is always constant and equals exactly 90°.

Q68. Answer: (c) 1

The Correct Answer is 1.

Key Points

• Atmospheric Pressure

• Atmospheric pressure is the pressure at any point on the surface of the earth due to the weight of the column of air above that point.

• Air is an extremely compressible gas having its own weight.

• The pressure exerted by air due to its weight is called atmospheric pressure on the Earth's surface.

• The Atmospheric pressure at sea level is 1 atm.

• Atmospheric pressure is commonly measured with a barometer.

• Atmospheric pressure is described by meteorologists as to how high the mercury rises.

• The standard (symbol: atm) is a unit of atmospheric pressure.

• Barograph is used for continuous recording of atmospheric pressure.

Additional Information

• It can be measured using mercury in the equation atmospheric pressure = density of mercury x acceleration due to gravity x-height of the column of mercury.

• A pascal is a pressure of one newton per square meter.

Q69. Answer: (c) Sekhar Naik

The correct answer is Sekhar Naik.

• Sekhar Naik was awarded Padma Shri in 2017 for his/her contribution to Indian sports.

Key Points

• Shekhar Naik is a blind cricketer and a former captain of the India national blind cricket team.

• He captained India at the T20 Blind Cricket World Cup in 2012 and Blind Cricket World Cup in 2014 and gave victories in both.

• Padma Shri is India's fourth-highest civilian honour.

Additional Information

• Devendra Jhajharia is a Paralympic javelin thrower and competes in F46 events.

• He got the Padma Shri in 2012.

• Brij Bhushan Mohanty is a boxing coach and was honoured with the Dronacharya Award.

Q70. Answer: (d) Oxygen diffuses from lungs into blood and carbon dioxide diffuses from blood into lungs

The correct answer is Oxygen diffuses from the lungs into the blood and carbon dioxide diffuses from the blood into the lungs.

• Oxygen diffuses from the lungs into blood and carbon dioxide diffuses from the blood into the lungs.

Key Points

• The pulmonary vein carrying the blood from the lungs to the left auricle has pure blood.

• The blood vessel carrying the blood from the heart towards the body is called the artery.

• In artery, there is pure blood i.e. oxygen mixed blood. Its exception is the pulmonary artery.

• The pulmonary artery carries the blood from the right ventricle to the lungs. It contains impure blood.

• The artery carrying blood to the muscles of the heart are called coronary arteries.

Additional Information

• The overall passage of air in humans is as follows: Nostrils–Pharynx–Larynx–Trachea–Bronchi– Bronchioles – Alveoli–Cells–Blood.

Q71. Answer: (c) analogous organs

The correct answer is analogous organs.

• The organs that have different basic structures (or different basic designs) but have a similar appearance and perform similar functions are called analogous organs.

Key Points

• Analogous Organs:

• Analogous organs have similar functions but different origins.

• These are developed in widely different organisms phylogenetically due to similar habitats and modes of life, e.g., wings of insects, birds and bats eyes of octopus and mammals.

Additional Information

• Fossils are the remains of ancient plant or animal which provide evidence for evolution.

• Homologous Organs are organs that are similar in basic structure and origin but dissimilar in functions.

• E.g., wings of bat, cat's paws, front-foot of a horse, human's hand and wings of a bird.

• Vestigial organ: These are organs that appear functionless in an organism but functional in their ancestor, for example, the vermiform appendix of the large intestine and the nictitating membrane of humans.

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• Archaeopteryx: It is a fossil that looks like a bird but bears a number of features found in reptiles. So, it is a connecting link between apes and reptiles.

Q72. Answer: (c) Only argument II is strong

In given it states that 'Watching cartoon movies is better than reading books',

In given arguments there are two arguments

First argument states that watching cartoon movies is entertaining which is not certain and correct because this is not for every child.

Second argument states that reading books inculcates love of knowledge and reading habit in children which is 100% true.

That argument is strong which is completely good for everymen and there is not a contradictory condition.

Hence, only argument II is strong.

Q73. Answer: (d) Agriculture

The correct answer is Agriculture.

• In the context of the Indian economy, the primary sector is a subject under the primary sector.

Key Points

• The primary sector in India includes those activities which lead to the production of goods by utilization of natural resources.

• Primary Sector includes Agriculture forestry, fishing.

Additional Information

• The secondary sector includes those economic sectors that create a finished usable product and depend on primary sector industries for the raw materials.

• Secondary Sector includes Mining, manufacturing, electricity gas and water supply, construction.

• Tertiary sector services involve the transport, distribution and sale of goods from producer to consumers as may happen in wholesaling and retailing, or may involve the provision of a service, such as in pest control or entertainment.

Q74. Answer: (a) Only (1) and (2)

Shortcut Trick

1. Mode is the value with the highest frequency, which is the peak of a Histogram.

2. Central Tendency (Mean, Median, Mode) is affected by both Origin (+/−) and Scale (×/÷).

3. Dispersion (Variance, SD) is independent of Origin but dependent on Scale.

4. Since Variance changes by b^2 when the scale changes by b, Statement 3 is incorrect.

5. Statements 1 and 2 are mathematically valid properties.

Therefore The correct answer is Only (1) and (2).

Alternate Method

Given Statements: (1) Mode from Histogram, (2) Median dependence on scale, (3) Variance independence on origin and scale.

Analysis of Statements:

=> Statement 1: The Mode of a grouped frequency distribution can be determined graphically by identifying the highest bar in a Histogram and using the intersection of lines from adjacent bars. (Correct)

=> Statement 2: If every observation x_i is changed to $y_i = a + bx_i$, then Median(y) = a + b × Median(x). Since the Median changes with the multiplier 'b', it is not independent of the change of scale. (Correct)

=> Statement 3: For the transformation $y_i = a + bx_i$, the Variance is given by $Var(y) = b^2 \times Var(x)$. While it is independent of 'a' (origin), it is dependent on 'b' (scale). (Incorrect)

Therefore The correct answer is Only (1) and (2).

Additional Information

Change of Origin and Scale

Change of origin refers to adding or subtracting a constant (x + a), while change of scale refers to multiplying or dividing by a constant (x × b).

Properties of Mean, Median, and Mode

All measures of central tendency are affected by both change of origin and change of scale: New Value = a + b × (Old Value).

Properties of Variance and Standard Deviation

Measures of dispersion are independent of origin but dependent on scale: New SD = |b| × Old SD and New Var = b^2 × Old Var.

Graphical Representation

Mode is found using a Histogram, while Median is found using Ogives (cumulative frequency curves).

Q75. Answer: (d) flowers

The correct answer is flowers.

• The reproductive parts of angiosperms are located in the flowers.

Key Points

• Angiosperms are vascular plants and have stems, roots, and leaves.

• Unlike gymnosperms such as conifers and cycads, angiosperm's seeds are found in a flower.

• Angiosperm eggs are fertilized and develop into a seed in an ovary that is in a flower.

• Flower:

• This is the reproductive part of the plant.

• In the flower Calyx, Corolla, Androecium and Gynoecium are found.

• Out of these, androecium is a male sex organ and the Gynoecium is a female sex organ.

Additional Information

• The root is the descending part of the plant which develops from radicle.

• Root always grows in the soil away from light.

• Stem is the part of a plant which grows towards the light.

• It develops from plumule.

• The main function of leaves is to make food through photosynthesis.

Q76. Answer: (b) 1611811

All code is written as their alphabetically place value,

STAR is coded as 1920118

S = 19

T = 20

A = 1

R = 18

MARS is coded as 1311819

M = 13

A = 1

R = 18

S = 19

So, PARK is coded as,

P = 16

A = 1

R = 18

K = 11

Hence, PARK is coded as 1611811.

Q77. Answer: (a) Both I and II are sufficient

Shortcut Trick

To find the value of n in $x^2 - nx + 1 = 0$, we need a specific value for x.

Statement I provides the quadratic equation but contains two unknowns.

Statement II provides the root x = 1, which satisfies the equation.

Substituting x = 1 into the equation uniquely determines the value of n.

Thus, both statements are necessary to answer the question.

Therefore The correct answer is Both I and II are sufficient.

Alternate Method

Given:

Statement I: $x^2 - nx + 1 = 0$

Statement II: x = 1 is a solution of the equation.

Formula Used:

If α is a root of the equation f(x) = 0, then f(α) = 0.

Calculations:

=> From Statement I, we have the quadratic expression: $f(x) = x^2 - nx + 1$

=> From Statement II, we know that $x = 1$ satisfies the equation $f(x) = 0$.

=> Substituting $x = 1$ into the equation: $(1)^2 - n(1) + 1 = 0$

=> $1 - n + 1 = 0$

=> $2 - n = 0$

=> $n = 2$

Since the value of n can only be determined by using both statements together, they are both sufficient.

Therefore The correct answer is Both I and II are sufficient.

Additional Information

Root of a Quadratic Equation

A value of the variable that makes the quadratic polynomial equal to zero is called a root or solution.

Sum and Product of Roots

For $ax^2 + bx + c = 0$, the sum of roots is $-b/a$ and the product of roots is c/a.

Data Sufficiency Logic

A statement is sufficient if it leads to a unique answer. If multiple values are possible, it is insufficient.

Q78. Answer: (b) C

There are two intersecting line and one vertical line bisects these intersecting lines.

Hence, Figure C is correct.

Q79. Answer: (b) 3.47

Shortcut Trick

To double an amount under Simple Interest, the interest earned must be equal to the principal (100% of the principal).

Using the formula: Time (T) = 100 ÷ Rate (R)

T = 100 ÷ 28.75 ≈ 3.478 years

Therefore The correct answer is 3.47 years.

Alternate Method

Let the Principal be P.

Since the amount doubles, the Amount (A) = 2P.

The Simple Interest (SI) earned = A − P = 2P − P = P.

Given Rate of Interest (R) = 28.75% per annum.

Formula used: SI = (P × R × T) ÷ 100

=> P = (P × 28.75 × T) ÷ 100

=> 1 = (28.75 × T) ÷ 100

=> T = 100 ÷ 28.75

=> T = 10000 ÷ 2875

=> T ≈ 3.478 years

Rounding to two decimal places gives 3.47 years.

Therefore The correct answer is 3.47 years.

Additional Information

Doubling Rule under Simple Interest

To double any principal sum, the required time period T is always calculated as 100 ÷ R, where R is the annual rate percentage.

Tripling Rule under Simple Interest

To triple any principal sum, the required time period T is calculated as 200 ÷ R, since the interest component must equal 2 × Principal.

2

Q80. Answer: (a) Hydrogen gas and iron chloride are produced

The correct answer is Hydrogen gas and iron chloride are produced.

• When dilute hydrochloric acid is added to iron filings hydrogen gas and iron chloride are produced.

Key Points

• When acid and metal are reacted it gives salt and hydrogen gas.

• The reaction is given by Acid + Metal → Salt + Hydrogen gas.

• 2HCl + Fe → FeCl2 + H2

Additional Information
• Acid:
• An acid is a substance which
• Is sour to taste.
• Turns blue litmus paper into red.
• Contains replaceable hydrogen.
• Gives hydrogen ion (H+) in aqueous solution.
• Can donate a proton.
• Can accept an electron.
• Uses of HCI:
• Used as a bathroom cleaner.
• As a pickling agent before galvanization.
• In the tanning of leather.
• In the dying and textile industry.
• In the manufacture of gelatin from bones.

Q81. Answer: (a) Cytokinins

The Correct Answer is Cytokinins.

Key Points
• Cytokinins (CK) are a class of plant growth substances that promote cell division, or cytokinesis.
• They are involved primarily in cell growth and differentiation, but also axillary bud growth, and leaf senescence.
• Cytokinins are produced in the root apical meristems and travel upward.

Additional Information
• Auxin is a plant hormone produced in the stem tip that promotes cell elongation.
• Abscisic Acid functions in many plant developmental processes, including seed and bud dormancy.
• Gibberellins stimulate elongation of the stem, flowering and germination.

Q82. Answer: (a) 1 watt

The correct answer is 1 watt.
• The correct answer is 1 watt.

Key Points
• Power:
• The rate of doing work is called power.
• SI unit of power is watt named as a respect to the scientist James Watt or Joule Per second and it is a scalar quantity.
• 1 W = 1 J/s
• 1 kW = 103 W
• 1 MW = 106 W
• 1 Watt/s (W–s) = 1 J
• Horse power is a practical unit of power.
• 1 H.P. = 746 watt.
• Power is the rate at which work is done. It is the work/time ratio. Mathematically, it is computed using the following equation:
• Power = W/T

Additional Information
• Ohm is the unit of resistance.
• Ampere is the unit of electric current.
• Coulomb is the unit of electric charge.

Q83. Answer: (c) B

DIAGRAM

In the given image first image changed to second image in 90° anti-clockwise direction. Hence, third image changed with B's image which is 90° anti-clockwise direction.

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Hence, Figure B is the correct answer.

Q84. Answer: (d) Kerala

The correct answer is Kerala.

• Periyar National Park is in Kerala.

Key Points

• Periyar National Park and Wildlife Sanctuary is a protected area near Thekkady and is spread in the districts of Idukki, Kottayam and Pathanamthitta in Kerala.

• It is notable as an elephant and a tiger reserve.

• It comprises a range of vegetation of tropical evergreen and semi-evergreen forests, moist deciduous forests, grasslands and eucalyptus plantations.

• The rivers Periyar and Pamba flow through the reserve.

Additional Information

• Mudumalai National park, Mukurti National park and Annamalai National parks are in Tamil Nadu.

• Dr. Salim Ali Bird Sanctuary and Mollem National Park are in Goa.

• Bannerghatta National Park, Bandipur National Park, Nagarhole National Park, Kudremukh National Park and Anshi National Park are in Karnataka.

Q85. Answer: (a) 35

The Correct Answer is 35.

• Bromine is a number that has an atomic number 35.

• Chorine and Bromine belong to the halogen group.

Key Points

• Chlorine is a chemical element with Atomic number 17 and Symbol Cl.

• An atom has a mass number of 35 and an atomic number of 17.

• The mass number is defined as the total number of protons and neutrons in an atom.

• It is the second lightest of the halogen group in the periodic table.

• Chlorine is used to prepare PVC, insecticides herbicides, etc.

Additional Information

• The atomic number is the number of protons in the nucleus of an atom.

• Chlorine is a yellow-green gas at room temperature.

• Halogens:

• Fluorine is used in the preparation of UF6 and SF6 for energy production and as dielectric constant, respectively.

• By using HF, chlorofluorocarbon compound and polytetrafluoroethylene can be synthesized.

• Chlorofluorocarbon is known as Freon and is used as refrigerant and aerosol.

• Non-stick utensils are made up of Teflon.

• Bromine is used in ethylene bromide synthesis which is mixed with leaded petrol.

Q86. Answer: (d) Chandi Prasad Bhatt

The Correct Answer is Chandi Prasad Bhatt.

Key Points

• Chandi Prasad Bhatt is an Indian Gandhian environmentalist and social activist.

• He founded Dasholi Gram Swarajya Sangh (DGSS) in Gopeshwar in 1964.

• He was awarded the Ramon Magsaysay Award for Community Leadership in 1982, followed by the Padma Bhushan in 2005.

Additional Information

• The chipko movement was a non-violent agitation in 1973 that was aimed at the protection and conservation of trees.

• Sundelal Bahuguna was the most prominent leader of this moment.

Q87. Answer: (c) 75

Shortcut Trick

To find the greatest number that leaves the same remainder, calculate the HCF of the differences between the numbers.

Difference 1 = 151 − 76 = 75

Difference 2 = 226 − 151 = 75

Difference 3 = 226 − 76 = 150

HCF(75, 75, 150) = 75

Therefore The correct answer is 75.

Alternate Method

Given: Numbers are 76, 151, and 226.

Formula: If numbers x, y, and z leave the same remainder when divided by 'n', then 'n' is the HCF of |x−y|, |y−z|, and |z−x|.

=> First difference = 151 − 76 = 75

=> Second difference = 226 − 151 = 75

=> Third difference = 226 − 76 = 150

=> Required number = HCF(75, 75, 150)

=> Factors of 75 = 1, 3, 5, 15, 25, 75

=> Factors of 150 = 1, 2, 3, 5, 6, 10, 15, 25, 30, 50, 75, 150

=> Highest Common Factor = 75

Therefore The correct answer is 75.

Additional Information

HCF with Same Remainder

When the remainder is not given, the HCF is calculated from the absolute differences of the numbers taken in pairs.

HCF with Different Remainders

If remainders a, b, c are specified, subtract them from the numbers first: HCF(x−a, y−b, z−c).

Relationship between LCM and HCF

For two numbers A and B, A × B = HCF(A, B) × LCM(A, B).

Q88. Answer: (b) [figure]

In atomic structure Atoms consist of three basic particles: protons, electrons, and neutrons. So protons and electrons must be part of atom but electron and proton are two different thing.

Hence, they are structured in different circle.

Hence, option 2 is the correct answer.

Q89. Answer: (d) Mahendra Singh Dhoni

In above option all of them are astronauts except Mahendra Singh Dhoni. Mahendra Singh Dhoni is a cricketer.

Hence, Mahendra Singh Dhoni is not belonging to the group.

Q90. Answer: (d) Dogfish

The correct answer is Dogfish.

• Dogfish is a true marine fish.

Key Points

• Phylum Chordata

• Pisces Main features

• Aquatic life.

• All these are cold-blooded animals.

• The heart pumps only impure blood and has two chambers.

• Respiration takes place through gills.

Additional Information

• Jellyfish comes under the phylum Cnidaria.

• Starfish comes under the phylum Echinodermata.

• Silverfish is an insect and comes under the phylum Arthropoda.

Q91. Answer: (a) B

The left and right of a mirror image appears reverse because reflection stares back image.

Hence, REACH will be display from right to left.

Option1 follows the correct lateral mirror image of ‘REACH’.

Hence, figure B is the correct answer.

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Q92. Answer: (d) D

In this diagram circle and triangle moves in clockwise direction within the box. So, after completing four step it would come at his initial stage.

Following images will be formed after next rotation.

DIAGRAM

Hence, figure D is the correct answer.

Q93. Answer: (c) 225

Shortcut Trick

Total ratio parts = 5 + 9 = 14 units.

14 units → 350 marbles.

1 unit → 350 ÷ 14 = 25 marbles.

Savita's share (9 units) = 9 × 25 = 225 marbles.

Therefore The correct answer is 225 marbles.

Alternate Method

Given: Total marbles = 350, Ratio of Sita to Savita = 5 : 9.

Formula Used: Individual Share = (Individual Ratio ÷ Total Ratio Sum) × Total Quantity

=> Let the marbles with Sita and Savita be 5x and 9x respectively.

=> 5x + 9x = 350

=> 14x = 350

=> x = 350 ÷ 14 = 25

=> Savita's share = 9x = 9 × 25 = 225

Therefore The correct answer is 225 marbles.

Additional Information

Ratio Division

To divide a quantity X in ratio a:b, the parts are [a/(a+b)] × X and [b/(a+b)] × X.

Proportion Rule

If a, b, c, d are in proportion, then Product of Extremes (a × d) = Product of Means (b × c).

Compound Ratio

The compound ratio of (a : b) and (c : d) is calculated as (a × c) : (b × d).

Q94. Answer: (b) Moonlight

The correct answer is Moonlight.

• Moonlight won the Oscars for Best Picture in 2017.

Key Points

• The 89th Academy Awards which is also known as Oscars was held at the Dolby Theatre in Hollywood, Los Angeles.

• Best Picture award was given to Moonlight.

• Best Actress award was given to Emma Stone (La La Land).

• Best Actor award was given to Casey Affleck (Manchester By The Sea).

Additional Information

• OSCAR AWARD:

• Oscar Award was instituted in 1929 and is conferred annually by the Academy of Motion Pictures in the United States.

• The awards ceremony was first televised in 1953 and is now seen live in more than 200 countries.

• Mahboob Khan’s Mother India was the first Indian film to be nominated in the best foreign film category in 1958.

• The first Indian to share the Oscar was Bhanu Athaiya for the film ‘Gandhi’.

• Satyajeet Ray was the first Indian who was awarded Oscar for lifetime achievement in cinema in 1992.

Q95. Answer: (b) B

In all the diagrams except B, there are even number of lines, where in figure B, there are 3 lines which is an odd number.

Hence, Fig B is odd from other than three images given in the question.

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Q96. Answer: (a) vibrating objects

The correct answer is vibrating objects.

• Sound is produced by vibrating objects.

Key Points

• Sound Wave:

• It is longitudinal mechanical.

• The longitudinal mechanical waves which lie in the range of 20 Hz to 20,000 Hz are called audible or sound waves.

• The longitudinal mechanical waves having frequencies less than 20 Hz are called infrasonic.

• These are produced by earthquakes, volcanic, eruptions, Ocean waves, elephants, and whales.

• The longitudinal mechanical waves having frequencies greater than 20,000 Hz are called ultrasonic waves.

• The speed of sound depends upon the elasticity and density of the medium.

Q97. Answer: (d) 1 km

Mehek starts walking facing the sun at 6:00 AM in the morning it means she moves in east direction.

And we assume the breath of the Road is negligible, so that if she go 1 km and take U-turn and go 1 km then she come at crossroad which is 1 km away from her initial point.

Hence, 1 km is the correct answer.

Q98. Answer: (b) 180 m2

Shortcut Trick

Area of parallelogram = 2 × Area of triangle formed by sides and diagonal.

Sides are 12, 17, 25. Semi-perimeter (s) = (12 + 17 + 25) ÷ 2 = 27.

Area of one triangle = √[27 × (27−12) × (27−17) × (27−25)] = √[27 × 15 × 10 × 2] = 90 m².

Total Area = 2 × 90 = 180 m².

Therefore The correct answer is 180 m².

Alternate Method

Given: Sides a = 17 m, b = 12 m and diagonal d = 25 m.

Formula: A diagonal divides a parallelogram into two congruent triangles of equal area.

=> Semi-perimeter of triangle s = (a + b + d) ÷ 2

=> s = (17 + 12 + 25) ÷ 2 = 54 ÷ 2 = 27 m

=> Area of triangle = √[s(s − a)(s − b)(s − d)]

=> Area = √[27 × (27 − 17) × (27 − 12) × (27 − 25)]

=> Area = √[27 × 10 × 15 × 2]

=> Area = √[8100] = 90 m²

=> Total Area of parallelogram = 2 × 90

=> Area = 180 m²

Therefore The correct answer is 180 m².

Additional Information

Area of Parallelogram

Standard formula is Base × Height or ab sin(θ) where θ is the angle between sides.

Properties of Diagonals

Sum of squares of diagonals: $d1^2 + d2^2 = 2(a^2 + b^2)$.

Heron's Formula

Used for triangles with sides a, b, c: Area = √[s(s−a)(s−b)(s−c)] where s is the semi-perimeter.

Q99. Answer: (c) Metals have 1 to 3 valence electrons in their outermost orbit.

The Correct Answer is Metals have 1 to 3 valence electrons in their outermost orbit.

Key Points

• Metals usually have 1, 2, or 3 electrons in their valence shell.

• A valence shell means the outermost shell of an atom containing the valence electrons.

• The greater the number of shells and the lesser the number of valence electrons, the greater is the reactivity of the metal.

Additional Information

• The atom of every element has different electronic configurations.

• For example, Sodium Atomic no.=11
• Therefore electronic configuration of Sodium is 2 8 1.

Q100. Answer: (c) 6 hours

Shortcut Trick
Let Total Capacity of the cistern be LCM(15, 25) = 75 units.
Efficiency of A = 75 ÷ 15 = 5 units/hr; Efficiency of B = 75 ÷ 25 = 3 units/hr.
If B worked for the entire 21 hours, it would fill 21 × 3 = 63 units.
Extra units filled by A = 75 − 63 = 12 units.
Difference in efficiency (A − B) = 5 − 3 = 2 units/hr.
Time Pipe A was open = 12 ÷ 2 = 6 hours.
Therefore The correct answer is 6 hr.
Alternate Method
Given: Pipe A fills in 15 hr, Pipe B fills in 25 hr. Total time = 21 hr.

Person	Days	Total Work	Efficiency
Pipe A	15	75	5
Pipe B	25	3	

Let Pipe A be open for 't' hours.
Then Pipe B was open for (21 − t) hours.
=> (5 × t) + 3 × (21 − t) = 75
=> 5t + 63 − 3t = 75
=> 2t = 75 − 63
=> 2t = 12
=> t = 6 hr
Therefore The correct answer is 6 hr.
Additional Information
Pipes and Cisterns Efficiency
Efficiency is inversely proportional to the time taken to fill the tank. Total Work = Efficiency × Time.
Inlet vs Outlet Pipes
Inlet pipes have positive efficiency (+), while outlet (leak) pipes have negative efficiency (−) as they empty the cistern.

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