RRC Group D Previous Year Paper 34 (Held On: 4 Oct 2018 Shift 2)

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

Take this paper as a timed mock test

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

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CBT

Q1. The girth of stem or root increases due to _____.

(a) Parenchyma
(b) Lateral Meristem
(c) Apical Meristem
(d) Intercalary Meristem

Q2. Identify the odd one from the given group:

(a) iPad
(b) Mobile phone
(c) Desktop computer
(d) Laptop

Q3. While filling a ___, __ can be compressed easily hence they can be filled within a vessel at high pressure. This property of ____ allows their convenient filling into a small container r cylinder and also in a large volume. It also allows their easy transport from one place to another.

(a) solid matter; solid; gases
(b) gas container; water; gases
(c) water tanker; water; water
(d) gas container; gases; gasses

Q4. Two arguments are given below the statement. Decide which argument is strong or more related to the given statement.

Statement:

To maintain the mental health of children they should be counselled regularly.

Argument:

I. Yes, Mental health is as important as physical health because it leads to overall development of children.

II. No, counselling is a time consuming task and causes wastage of children time.

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

Q5. Where is the Namib Desert located?

(a) Southern Africa
(b) United States
(c) Brazil
(d) Afghanistan

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Q6. If in a code language 'SHOE' is written as 'EOHS' then how will 'LACE' be written?

(a) LACF
(b) HSEO
(c) ECAL
(d) MBDF

Q7. In some multicellular organism like Rhizopus, mushrooms, and some bacteria, aspergillus etc. reproduction takes place by.

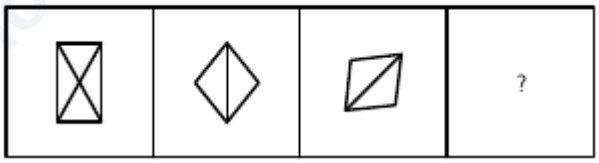
(a) Regeneration
(b) Fertilisation
(c) Fragmentation
(d) Spores

Q8. Who among the following was awarded with Dinanath Mangeshkar Award 2017, for his outstanding contribution to Cricket?

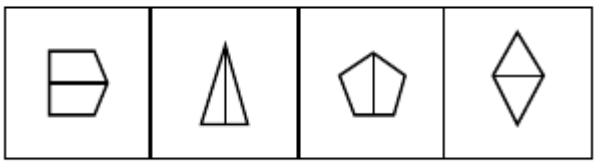
(a) Lala Amarnath
(b) Sunil Gavaskar
(c) Anil Kumble
(d) Kapil Dev

Q9. Select the option that can replace the question mark (?) in the given figure series.

Problem Figures:



Answer Figures:



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

Q10. DoT has given its approval to merge Idea Cellular with which other telecom provider?

(a) Jio
(b) Aircel
(c) Vodafone
(d) Airtel

Q11. Find the value of √0.5

(a) 0.897
(b) 0.787
(c) 0.947
(d) 0.707

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Q12. Which of these is NOT a Kharif crop?

(a) Wheat
(b) Groundnut
(c) Paddy
(d) Maize

Q13. 6 7 4 8 8 4 8 3 2 5 8 6 7 8 3 8

If the 1^(st) term of the above sequence is interchanged with the 2^(nd) term, the 3^(rd) with the 4^(th) and so on. Then how many 8s is there that are divisible by the number on their left as well as their right?

(a) 0
(b) 1
(c) 3
(d) 2

Q14. The calendar for the year 2018 is the same for the year:

(a) 2007
(b) 2006
(c) 2008
(d) 2009

Q15. Virat can complete a task in 20 days, whereas Anu can complete the same task in 15 days. How long will it take for Virat and Anu to complete the task if they worked together?

(a) 121/7 days
(b) 5 days
(c) 84/7 days
(d) 171/2 days

Q16. In the Modern Periodic Table, period __and __ contain two metalloids each.

(a) 4, 5
(b) 3, 4
(c) 5, 6
(d) 6, 7

Q17. Manoj used to spend 33% of his income on food. He got an increment of Rs. 1,000 but did not increase his expenditure on food items. As a result his expenditure on food dropped to 27%. What was his initial income?

(a) Rs. 5,500
(b) Rs. 6,500
(c) Rs. 5,000
(d) Rs. 4,500

Q18. _____ lens is used by people suffering form myopia.

(a) Cylindrical
(b) Concave
(c) Convex
(d) Convexo - concave

Q19. if $\cot^{4}\theta + \cot^{2}\theta = 4$, then $\operatorname{cosec}^{4}\theta - \operatorname{cosec}^{2}\theta = ?$

(a) 4
(b) 0
(c) 3
(d) 2

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Q20. Vibration indicates which type of motion of an object?

(a) Very slow
(b) Very fast
(c) Fast shaking
(d) Rapid to and fro

Q21. With whom can you associate the theory of evolution?

(a) Miller
(b) Darwin
(c) Mendel
(d) Urey

Q22. What is e-Governance?

(a) Effective administrative governance
(b) Systematic governance
(c) Technology driven governance
(d) Human driven governance

Q23. The electronic configuration of an element is 2, 8, 7, so its valency is:

(a) 2
(b) 8
(c) 7
(d) 1

Q24. The square root of 10201 is:

(a) 111
(b) 99
(c) 101
(d) 91

Q25. If $x + y = 1$, then $x^3 + y^3 + 3xy - 1 = ?$

(a) 0
(b) 5
(c) 2
(d) 1

Q26. In an alloy of German silver, the ratio of copper to zinc was 19 : 6 while that of nickel to zinc was 7 : 4. The ratio of copper to zinc to nickel in the alloy was:

(a) 38 : 12 : 21
(b) 133 : 42 : 24
(c) 19 : 44 : 4
(d) 19 : 24 : 7

Q27. Read the given statement (s) and conclusions carefully and select which of the conclusions logically follow (s) from the statement (s).

Statements:

I. No cat is white.

II. Some white are pandas.

Conclusions:

1. All pandas are white

2. Some cats are white.

(a) Conclusion 2 alone follows
(b) Both 1 and 2 follows
(c) Conclusion 1 alone follows

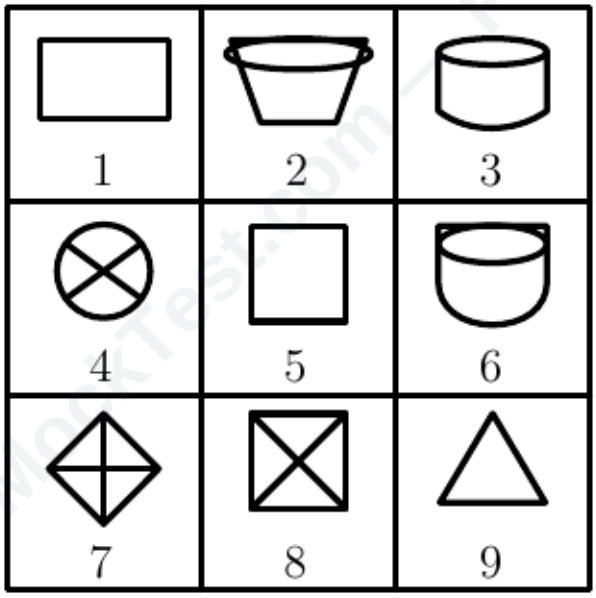
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(d) Neither 1 nor 2 follows
(e) Either 1 or 2 follows

Q28. Which of the following statements is true?

(a) The unit of relative density is kg m^(-2)
(b) The unit of relative density is kg m^(-3)
(c) Relative density has no unit
(d) The unit of relative density is kg m^3

Q29. Group the following figures into three classes on the basis of identical properties:



(a) 1, 3, 9; 2, 4, 6; 5, 7, 8
(b) 1, 5, 9; 2, 4, 6; 3, 5, 7
(c) 1, 2, 5; 3, 6, 7; 4, 8, 9
(d) 1, 5, 9; 2, 3, 6; 4, 8, 7

Q30. Which of the following statements is INCORRECT?

(a) Non-metals form acidic oxides
(b) Non - metals form cations
(c) Non-metals form anions
(d) Non- metals are bad conductors of electricity

Q31. The speed of sound waves is 700 ms^(-1). How long will the sound waves take to travel 7 km?

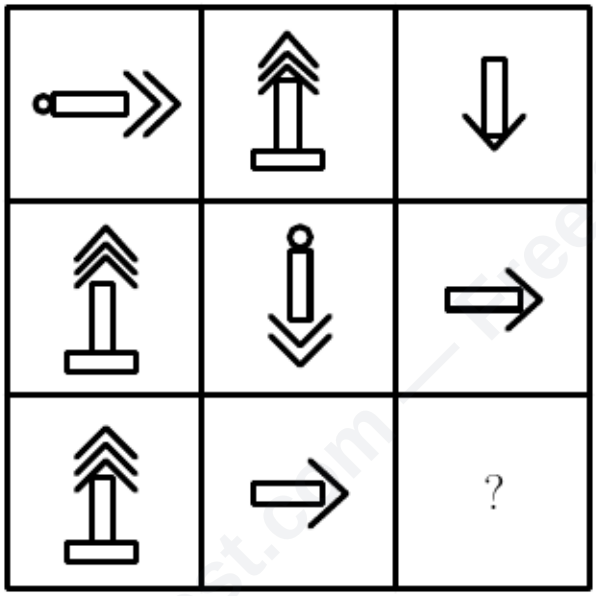
(a) 5 s
(b) 100 s
(c) 50 s
(d) 10 s

Q32. In a class of 10 students, the average age was 16 years. When two students left the class, the average of the remaining students became 16.25 years. What is the total age of the students left?

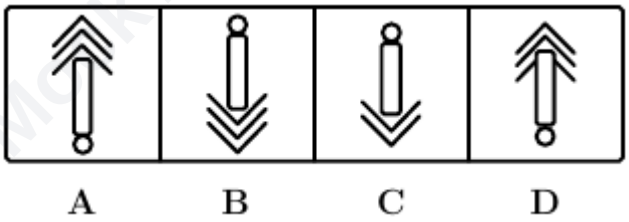
(a) 28 years
(b) 32 years
(c) 30 years
(d) 34 years

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Q33.



Choose the correct picture that replaces the (?) symbol above with the below give options:



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

Q34. Identify the Co-Prime pair form the given options.

(a) (16, 25)
(b) (36, 39)
(c) (42, 49)
(d) (12, 24)

Q35. You are given a questions and two statements.Identify which of the statements is / are necessary / sufficient to answer the question.

Question:

X is Y's brother.

Z is mother of Y.

How is Y related to X?

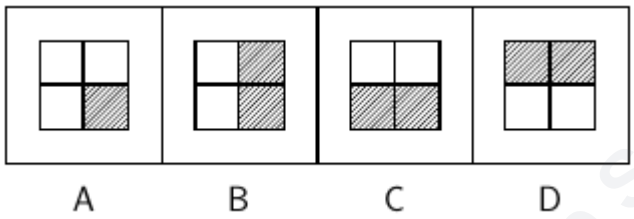
Statements:

1. Z has only 1 son and 1 daughter

2. X is only son of V who is father of Y has 2 children's

(a) Both 1 and 2 together are sufficient
(b) 2 alone is sufficient while 1 alone is not sufficient
(c) 1 alone is sufficient while 2 alone is not sufficient
(d) Either 1 or 2 alone is sufficient

Q36. Find the odd one out.



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

Q37. Find the rate of discount when the marked price is Rs. 1880 and selling price is Rs. 1598.

(a) 13%
(b) 12%
(c) 20%
(d) 15%

Q38. Pipes A and B can fill a water tank in 30 and 45 minutes respectively while pipe C can take out all the water in 60 minutes. If the three pipes are opened simultaneously, how long it would take to fill the empty tank?

(a) (25 + 5/7) min
(b) 60 min
(c) 34 + 1/2 min
(d) (18 + 5/7) min

Q39. A bullet, of mass 20 g, is horizontally fired with a velocity 150 ms^(-1) from a pistol of mass 2.5 kg. What is the recoil velocity of the pistol?

(a) • 1.25 ms^(-1)
(b) -1.5 ms^(-1)
(c) -1.2 ms^(-1)
(d) -2.0 ms^(-1)

Q40. Coulomb is the SI unit of:

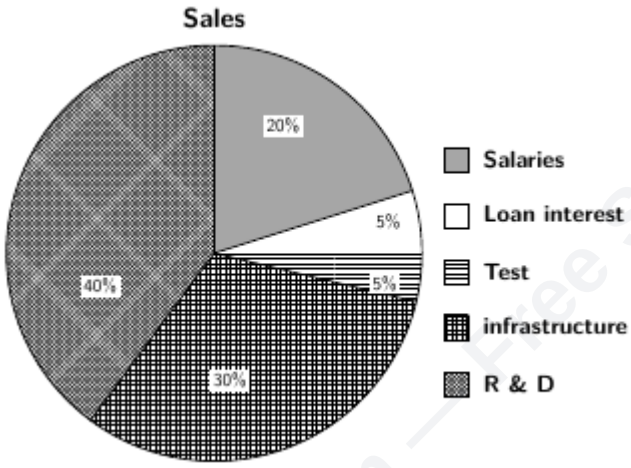
(a) Resistance
(b) Electric charge
(c) Electric current
(d) Potential difference

Q41. Who among the following is popularly known as 'The Mozart of Madras'?

(a) A. R. Rahman
(b) Ilayaraja
(c) Kishore kumar
(d) S. P. Balasubramaniam

Q42. Study the following pie chart and answer the question that follows. The pie chart shows company XYZ’s expenditure on various heads for Q3 2015

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If the company has spent a total of Rs. 120 lakh crores on the various heads, then how much was spend on loan interest (in lakh crores)?

(a) 12 Lakh
(b) 48 Lakh
(c) 24 Lakh
(d) 6 Lakh

Q43. In the question given below is a statement followed by two assumptions numbered I and II.

Decide which of the assumptions is/are implicit in the statement.

Statement:

"Nagpur has extreme climate" tells Ram's cousin Shyam while sipping tea.

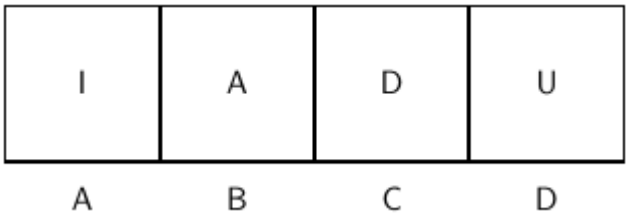
Assumptions:

I. Winters are cold and summers are hot in Nagpur.

II. Ram and Shyam are cousins

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

Q44. Identify the odd one out.



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

Q45. Which of the given reaction is opposite to combination reactions?

(a) Decomposition
(b) Precipitation
(c) Displacement
(d) Double displacement

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Q46. _____ is called quick lime.

(a) Calcium carbonate
(b) Calcium chloride
(c) Calcium hydroxide
(d) Calcium oxide

Q47. Name the American Civil Movement activist who delivered the famous speech, "I have a dream",

(a) Abraham Lincoln
(b) Victoria Woodhull
(c) Martin Luther King Jr.
(d) Lucy Stone

Q48. $114 \div [87 - \{ 37 - (55 - 84 \div 7 \times 4)\}] = ?$

(a) 13
(b) 8
(c) 4
(d) 2

Q49. The Union Ministry of Parliamentary Affairs (MoPA) has proposed rolling out of e-Sansad in Parliament and e-Vidhan in State Legislatures to:

(a) digitise and make their functioning smooth
(b) digitise and make their functioning non-transparent
(c) digitise and make their functioning paperless
(d) digitise and make their functioning debate and discussion less

Q50. Who from Maharashtra was honoured with the Padma Shri Award, 2018, in the field of Medicine?

(a) Shri Subhash
(b) Shri Abhay Bang
(c) Shri Jose Ma Joey
(d) Shri K.Srikanth

Q51. 11/16 of the residents of a housing society own cars and 20/33 of the car owners have purchased covered parking space. If 130 of the residents parked in the open, how many residents we there in the society?

(a) 400
(b) 480
(c) 384
(d) 320

Q52. Who among the following was conferred with the Padma Shri Award 2018, in the field of Literature and Education from Maharashtra?

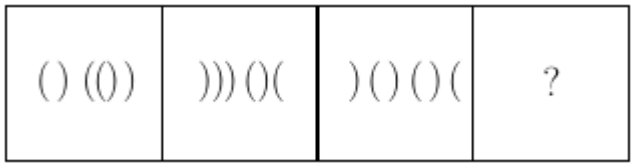
(a) Shri Arvind Gupta
(b) Shri Laxman Pai
(c) Shri Sharda Sinha
(d) Shri Manoj Joshi

Q53. Which mineral is found in Banda, Sonbhadra and Mirzapur districts?

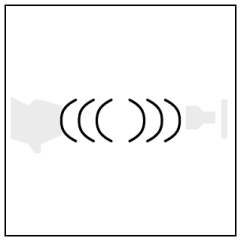
(a) Silver
(b) Dolomite
(c) Manganese
(d) Iron

Q54. Choose the correct option to complete the series:

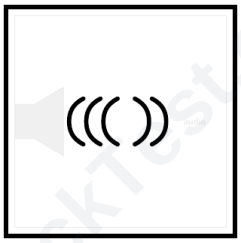
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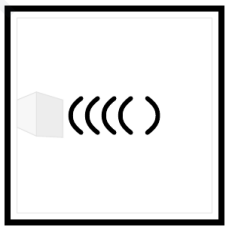
(a)



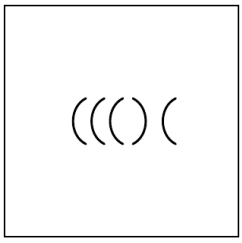
(b)



(c)



(d)



Q55. If 1.5 ÷ 12 = 0.125 what is the value of 1500 ÷ 0.012?

(a) 12500
(b) 125
(c) 125000
(d) 1250

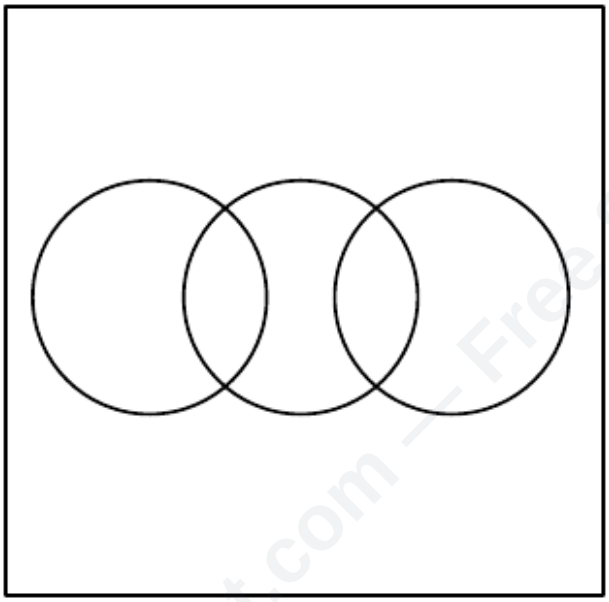
Q56. What is the number of particles present in 1 mole of any substance?

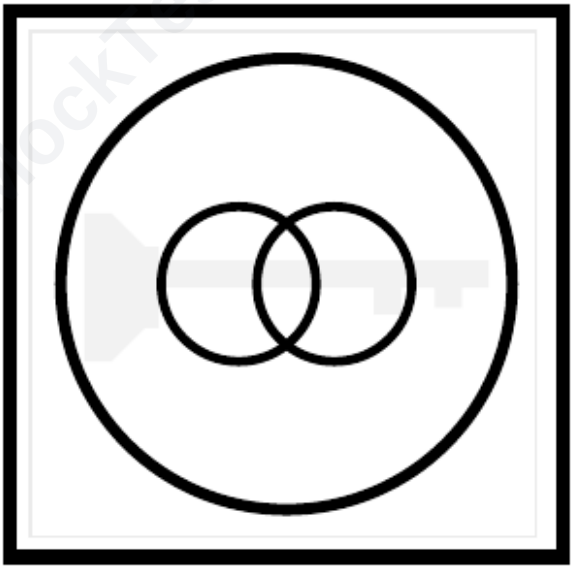
(a) 6.022×10^{23}
(b) 6.023 × 10^(-22)
(c) 6.022 × 10^(-23)
(d) 6.023×10^{22}

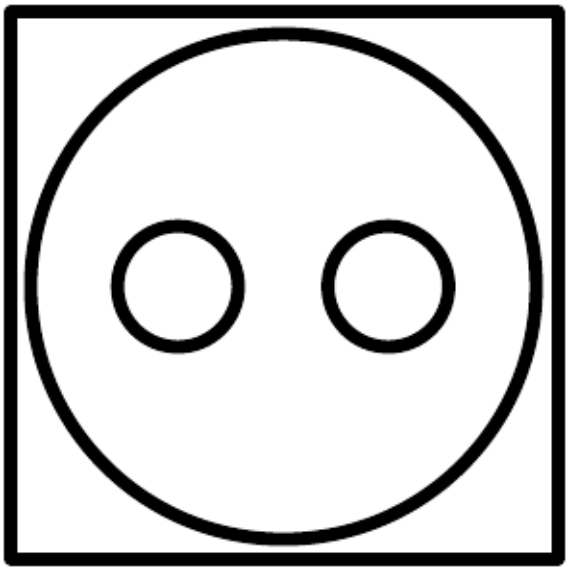
Q57. Choose the best suitable Venn diagram for the following words:

Females, Mothers,Sisters

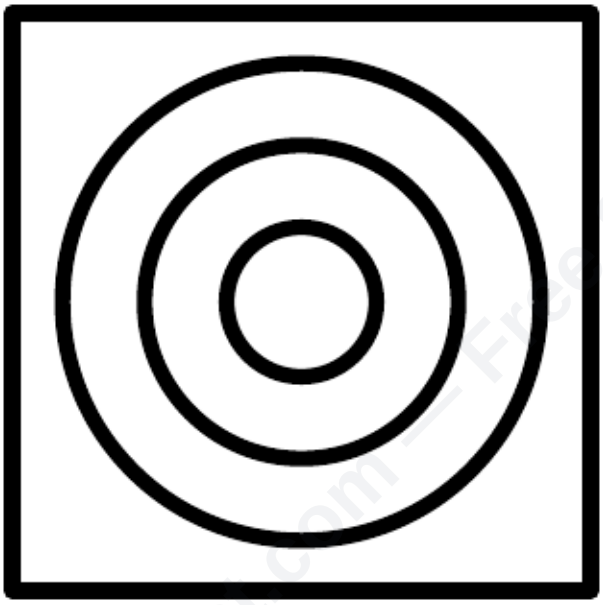
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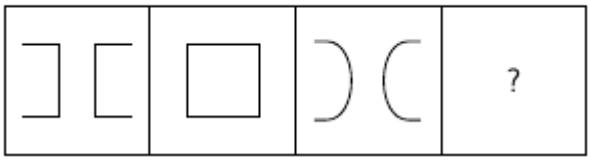
(a) 1
(b) 2
(c) 3
(d) 4

Q58. Who received the UNESCO Award of Merit for the iconic Srirangam Ranganathaswamy temple in Tiruchirapalli?
(a) M. Karunanidhi
(b) Edappadi K, Palanichamy
(c) O. Panneerselvam
(d) J. Jayalalithaa

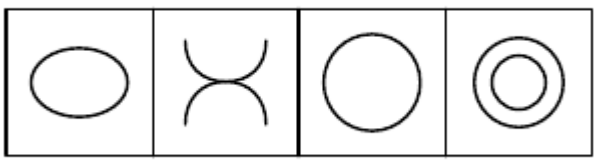
Q59. If East becomes North then what will be south become?
(a) South
(b) North
(c) West
(d) East

Q60. Pick the figure that will complete the given series.

Problem Figures:



Answer Figures:



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

Q61. The radii of two cylinders are in the ratio 2 : 3 while their heights are in the ration 5 : 3. then what would be the ratio of their volumes of the cylinders?

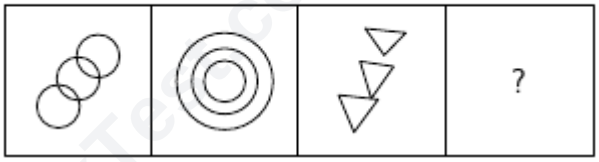
(a) 2 : 5
(b) 2 : 3
(c) 20 : 27
(d) 3 : 5

Q62. Which of the following will affect the resistance of a conductor inversely?

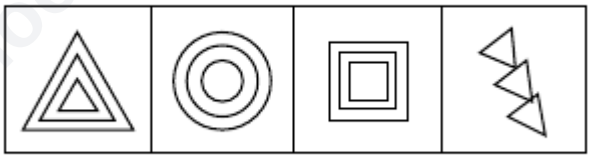
(a) Length of conductor
(b) Potential difference
(c) Area of cross section
(d) Temperature of conductor

Q63. Find the next figure for the given series:

Problem Figures:



Answer Figures:



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

Q64. Which of the following numbers will have an irrational square root?

(a) 9216
(b) 6561
(c) 8192
(d) 2704

Q65. The measure of each interior angle of a regular octagon is:

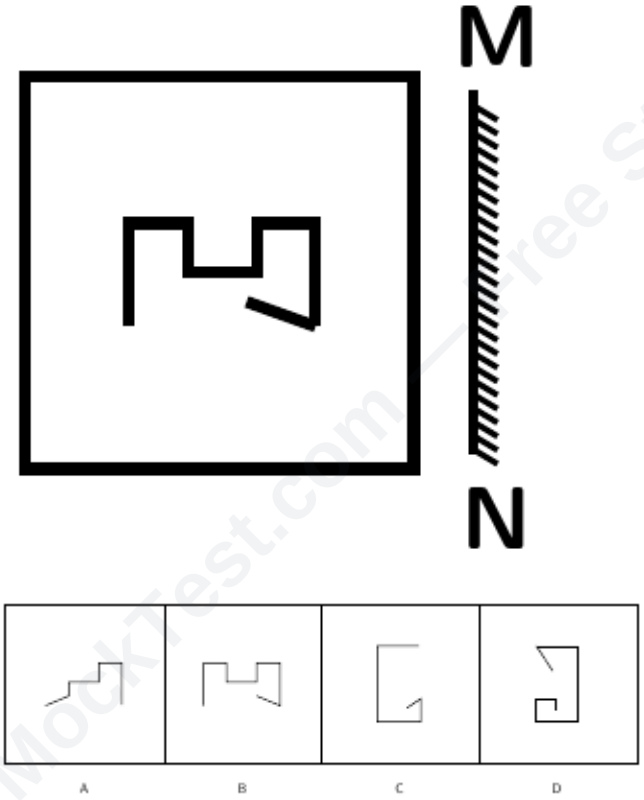
(a) 135°
(b) 125°
(c) 115°
(d) 120°

Q66. A tractor can finish its journey in 8 hours at the speed of 60 km/hr speed. If the same distance must be covered in 5 hours, what should be the speed of the tractor?

(a) 96 km/hr
(b) 90 km/hr
(c) 80 km/hr
(d) 86 km/hr

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Q67. Choose the mirror image for the following figure.



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

Q68. Who among the following was selected as Youth Boxer of the year 2017, by Asian Confederation of Youth Boxing?

(a) Sachin Siwach
(b) Ali Qamar
(c) Jitender Kumar
(d) Akhil Kumar

Q69. The following table shows the results of the students who have attended an examination. What percentage of students passed?

Result	No. of Students
Pass	150
Fail	100

(a) 30%
(b) 40%
(c) 60%
(d) 50%

Q70. A survey of 170 families, 115 drink Coffee, 110 drink Tea and 130 drink Milk. Also, 85 drink Coffee and Milk, 75 drink Coffee and Tea, 95 drink Tea and Milk, 70 drink all the three. Find How many use Coffee and Milk but not Tea.

(a) 18
(b) 25
(c) 20
(d) 15

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Q71. The force of attraction between two objects is called the _____.

(a) electromagnetic force
(b) centrifugal force
(c) gravitational force
(d) centripetal force

Q72. Find the next letter in the given series.

X, S, O, ? J

(a) K
(b) P
(c) G
(d) L

Q73. In a certain code. QUANTITY is written as YTITNAUQ. How will QUALITY be written as in that code?

(a) TYLAUG
(b) YTIUCQG
(c) IATYAQ
(d) YTILAUQ

Q74. The Battle of Khanwa was fought in the year _____.

(a) 1527
(b) 1521
(c) 1529
(d) 1525

Q75. Consider the given statement(s) and decide which of the given assumptions is/are implicit in the statement.

Statement:

Money is the root cause of all the crimes.

Assumptions:

I. Every crime has a cause.

II. There are crimes in every situation.

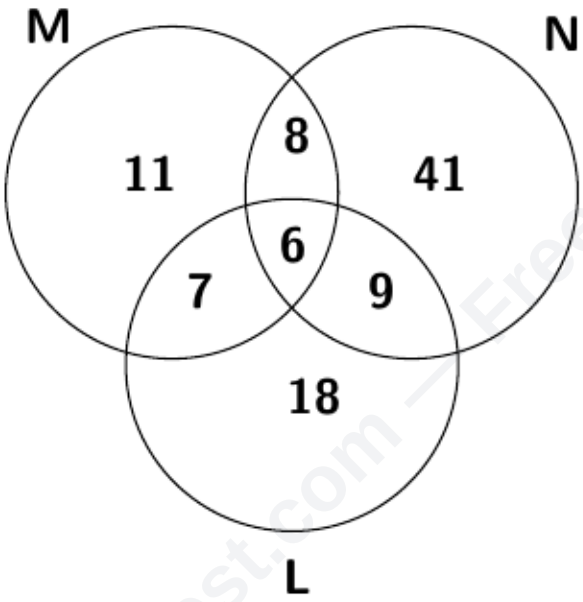
(a) Both I and II are implicit
(b) Only assumption I is implicit
(c) Only assumption II is implicit
(d) Neither I nor II is implicit

Q76. Who was bestowed with the Padma Bhushan award in the field of Art Music from Maharashtra in 2018?

(a) AR Rahman
(b) Ilaiyaraaja
(c) SP Balasubrahmanyam
(d) Arvind Parikh

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Q77.



The above Venn diagram represent the students who play 3 sports M, N and L in a class:

Total number of students who play game N is:

(a) 41
(b) 64
(c) 23
(d) 9

Q78. Sunda Strait lies between two islands. One of them is Java. Which is the other island?

(a) Maluku
(b) Borneo
(c) Sulawesi
(d) Sumatra

Q79. Which former Union Minister was conferred with the Japan's imperial decoration Order of the Rising Sun award for his contribution toward fostering Japan-India ties?

(a) Ashwani Kumar
(b) Sushma Swaraj
(c) Suresh Prabhu
(d) Nirmala Sitaraman

Q80. The value of 32 ÷ (20 – 12 ÷ 3 × 7) is:

(a) -8
(b) 8
(c) 2
(d) -4

Q81. With which of the following sports is Khushbir Kaur related to?

(a) Table tennis
(b) Cricket
(c) Basket ball
(d) Athletics

Q82. Select the option that is related to the third word on the same basis as the second world is related to the first word.

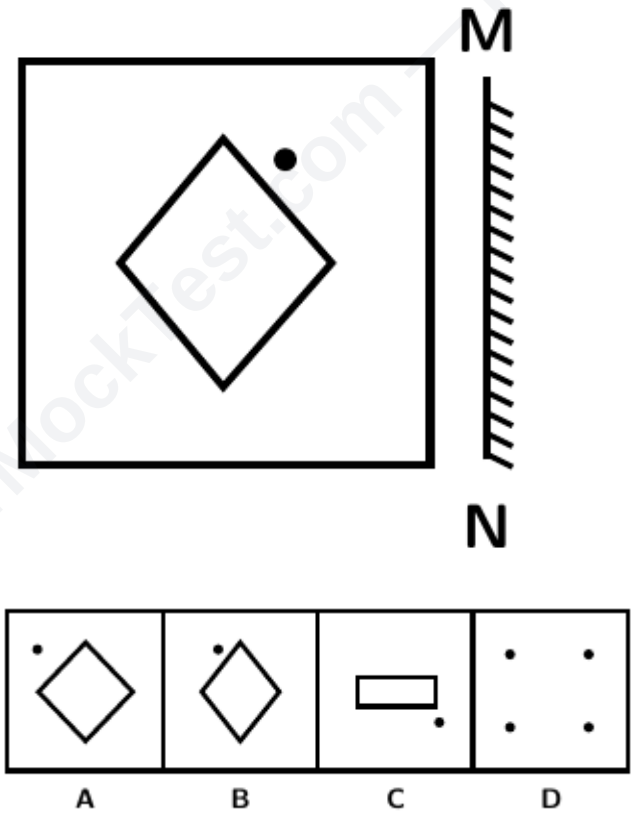
Neck : Head ? Ground :

(a) Paper
(b) Aeroplane

(c) Ship
(d) Trees

Q83. _____ is the molecular mass of H2SO4
(a) 98 u
(b) 99 u
(c) 90 u
(d) 96 u

Q84. Find the mirror image of the given figure if the mirror is placed at line MN.



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

Q85. Name the country where the Lok Sabha speaker Sumitra Mahajan attended the Conference of speakers and Presiding officers of the Commonwealth.
(a) Seychelles
(b) Sri Lanka
(c) Djibouti
(d) Mauritius

Q86. PVC stands for:
(a) Polyvinyl chloride
(b) Polyvinyl chlorate
(c) Polyvinyl carbon
(d) Polyvinyl carbonate

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Q87. If + means ÷, ÷ means -, - means ×, × means +, then 42 + 6 ÷ 5 – 3 × 70 = m?

(a) 62
(b) 68
(c) 70
(d) 72

Q88. Simplify the following expression:

7√48 + 7√147

(a) 76√3
(b) 77√7
(c) 77√3
(d) 76√7

Q89. Choose the option that is NOT true about vascular system.

(a) Blood flows at high pressure in arteries.
(b) Human heart is the size of an open hand
(c) The liquid component of blood is called plasma.
(d) Blood forms about 7-8% of the body weight

Q90. A porter lifts a luggage of 14 kg from the ground and puts it on his head 1.5 m above the ground. Calculate the work done by him on the luggage.

(a) 140 J
(b) 155 J
(c) 210 N
(d) 210 J

Q91. If tan A = 3/4, then (1 + cos A) (1 – cos A) / (1 + sin A) (1 – sin A) = ?

(a) 16/25
(b) 9/(25)
(c) 16/9
(d) (9)/16

Q92. A statement is followed two arguments.Decide which of the arguments is/are strong with respect to the statement.

Statement:

How to avoid mosquito breeding at home?

Arguments:

I. Yes, we should remove clutter and stagnant water. We should use mosquito repellents and other gadgets to prevent mosquito bites.

II. No, it is not possible to avert mosquitoes.They will come in particular season and breed.

We can try preventive measures.

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

Q93. By selling a stool for Rs. 72 a carpenter face a loss of 10%. How much percentage would he gain or lose by selling the stool for Rs. 96?

(a) Profit, 10%
(b) Loss, 25%
(c) Loss, 16%
(d) Profit, 20%

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Q94. Sclerenchyma is composed of _____.

(a) WBC
(b) complex cell
(c) non-living cell
(d) RBC

Q95. Find the kinetic energy of a ball of mass 2 kg moving with a speed of 30 ms^(-1)

(a) 900 W
(b) 900 Pa
(c) 900 N
(d) 900 J

Q96. Pipes A, B and C are attached to an empty cistern. The first two can fill the cistern in 7 and 10.5 hours, respectively, whereas the third can drain the cistern, when completely filled, in 6 hours. If all the three pipes are turned on simultaneously when the cistern is half-full, how many hours will be needed to fill the cistern?

(a) 8
(b) 14
(c) 7.5
(d) 7

Q97. Momentum of a body depends upon _____.

(a) force acting on an object
(b) mass of an object
(c) both mass and velocity of an object
(d) velocity of an object

Q98. Sham deposits Rs. X for 2 years at 8% per annum compounded interest annually, which amounts to Rs. 72,900. Then what is the value of 'X'?

(a) Rs. 60,000
(b) Rs. 62,000
(c) Rs. 62,500
(d) Rs. 60,500

Q99. 34 men can do a piece of work in 12 days. How many days will 51 men take to do it?

(a) 8
(b) 5
(c) 10
(d) 6

Q100. In an attempt to discover young talent, NITI Aayog, India's premier think-tank is launching the:

(a) Mentor India campaign
(b) Pravah India campaign
(c) Youth Ki Awaaz campaign
(d) Chetana India campaign

ANSWER KEY

1	b	2	c	3	d	4	a	5	a	6	c	7	d	8	d	9	b	10	c
11	d	12	a	13	a	14	a	15	c	16	a	17	d	18	b	19	a	20	d
21	b	22	c	23	d	24	c	25	a	26	a	27	d	28	c	29	d	30	b
31	d	32	c	33	d	34	a	35	d	36	d	37	d	38	a	39	c	40	b
41	a	42	d	43	b	44	b	45	a	46	d	47	c	48	d	49	c	50	b
51	b	52	a	53	b	54	b	55	c	56	a	57	b	58	b	59	d	60	b

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61	c	62	c	63	b	64	c	65	a	66	a	67	a	68	a	69	c	70	d
71	c	72	d	73	d	74	a	75	b	76	d	77	b	78	d	79	a	80	d
81	d	82	d	83	a	84	b	85	a	86	a	87	a	88	c	89	b	90	d
91	d	92	c	93	d	94	c	95	d	96	d	97	c	98	c	99	a	100	a

SOLUTIONS

Q1. Answer: (b) Lateral Meristem

The Correct Answer is Option 2 i.e Lateral meristem.

• Meristematic tissue:

• Growing regions of the plants are called Meristem.

• It is again divided into three types: Apical, Lateral and Intercalary meristems.

• Apical Meristems: These tissues are found in root and stem apex and it is responsible for the initial growth of the plants.

• Lateral meristem: The girth of stem or root increases due to this tissue.

• Intercalary meristem: Plants increase its length by the activity of this.

• Parenchyma: makes up most of the cells within leaves, flowers, and fruits.

Q2. Answer: (c) Desktop computer

All options except 'desktop computer' are portable device.

Hence, 'desktop computer' is the odd one out.

Q3. Answer: (d) gas container; gases; gasses

The Correct Answer is Option 4 i.e gas container; gases; gasses.

• A gas does not have either definite volume or definite shape.

• It can be compressed to a large extent on applying pressure and also takes the shape of the container where it is enclosed.

• While filling a gas container, gases can be compressed easily hence they can be filled within a vessel at high pressure.

• This property of gases allows their convenient filling into a small container r cylinder and also in a large volume.

• It also allows their easy transport from one place to another.

• If gas is put under extremely high pressure, it will become a liquid.

Q4. Answer: (a) Only argument I is strong

Argument I: Mental health is as important as physical health so to maintain the mental health of children they should counselled regularly. Hence, Argument I is strong.

Argument II: In statement it is clear to maintain mental health one should go for counselling

So argument II is not strong because it does not support the statement.

Hence, only argument I is strong.

Q5. Answer: (a) Southern Africa

The Correct Answer is Option 1 i.e Southern Africa.

Country	Famous Deserts
USA	Sonoran Desert, Mojave Desert, The Great Basin Desert, Chihuahuan Desert
Afghanistan	Registan Desert, Dasht-e Khash, Dasht-e Leil
Southern Africa	Namib desert, Kalahari desert, Karoo desert

Q6. Answer: (c) ECAL

The logic is:

Similarly,

Hence, 'ECAL' is the correct answer.

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Q7. Answer: (d) Spores

The Correct Answer is Option 4 i.e Spores.

• Spores:

• Spores are reproductive cells capable of developing into a new individual without fusion with another reproductive cell.

• Spores are the units of asexual reproduction.

• In some multicellular organisms like Rhizopus, mushrooms, and some bacteria, aspergillus, etc reproduction takes place by spores.

• Plants such as ferns also reproduce using spores instead of seeds.

• Fertilisation:

• Pollen tube reaches the egg cell after entering into the ovule through a pore called micropyle. After that a male nucleus fuse with egg cell. This is called fertilisation.

• Fragmentation:

• It is a form of asexual reproduction in which organisms split into fragments and each of these fragments develops into matured or full-grown individuals that are similar to their parents.

• Regeneration:

• It is the process of replacing or restoring damaged or missing cells, tissues, organs to full function.

Q8. Answer: (d) Kapil Dev

The Correct Answer is Option 4 i.e Kapil Dev.

• Aamir Khan was also honored with the 2017 Master Dinanath Mangeshkar Award for his film Dangal.

• Kapil Dev was awarded the 2017 Master Dinanath Mangeshkar Award for his outstanding contribution to the field of cricket.

• Master Dinanath Mangeshkar was instituted in 1999 in the memory of Dinanath Mangeshkar, father of Lata Mangeshkar.

• Kapil Dev:

• He was awarded with the Padma Shri in the year 1982 and the Padma Bhushan in the year 1991.

• He also won the Indian cricketer of the century award in 2002.

• Anil Kumble:

• He was awarded Padma Shri in the year 2005.

• He was awarded the 1995 Arjuna award for cricket.

• Sunil Gavaskar:

• In 2012 he was conferred with BCCI’s prestigious Col. CK Nayudu Lifetime Achievement Award.

• He was also inducted into the ICC hall of fame in the year 2009.

• Lala Amarnath:

• He was the first Test cricket captain of an independent India.

• He the first cricketer to score a Test century for India.

Q9. Answer: (b) D

All figure have five straight lines.

1) Figure A

= Number of lines are 6

2) Figure B

= Number of lines are 4

3) Figure C

= Number of lines are 6

4) Figure D

= Number of lines 5

So, image ‘D’ will be the next figure in the series.

Hence, "Option 2" is the correct answer.

Q10. Answer: (c) Vodafone

The Correct Answer is Option 3 i.e Vodafone.

• Vodafone:

• DoT has given its approval to merge Idea Cellular with Vodafone in the year 2018.

• Ravinder Takkar is the current CEO of Vodafone Idea.

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• Jio: It is a telecommunications company founded in the year 2007 by Mukesh Ambani.
• Aircel: It was founded in the year 1999 by Chinnakannan Sivasankaran with its headquarters at Gurugram.
• Airtel: It was founded in the year 1995 by Sunil Bharti Mittal with its headquarters in Delhi.
• Gopal Vittal is the current CEO of Bharti Airtel.

Q11. Answer: (d) 0.707

Formula:
If √x = K, then
We can find the root in two ways first factorization method and another division method:
Calculation:
=> √0.5
=> 0.707
Shortcut Trick0.5 ≈ 0.49
=> √0.5 ≈ √0.49
=> √0.5 ≈ 0.7
Only option D is close to 0.7
Therefore √0.5 = 0.707

Q12. Answer: (a) Wheat

The Correct Answer is Wheat.
Key Points
• Kharif Season:
• Kharif crops also are known as monsoon crops as they are cultivated in the monsoon season.
• These crops are sown at the beginning of the rainy season.
• Rice, maize, bajra, ragi, paddy, sorghum, soybean, groundnut, cotton, etc are all Kharif types of crops.
• Zaid Season:
• It is a short season between Kharif and Rabi seasons.
• The crops grown during this season are known as Zaid crops.
• Pumpkin, cucumber, watermelon, bitter gourd etc are all zaid types of crops.
• Rabi Season:
• These are the crops that are sown at the end of the monsoon season or at the beginning of the winter season.
• These crops also are known as winter crops.
• Wheat, Mustard, Pulses, Barley, etc. are all Rabi types of crops.

Q13. Answer: (a) 0

Given sequence: 6 7 4 8 8 4 8 3 2 5 8 6 7 8 3 8
After interchanging, the sequence becomes:
7 6 8 4 4 8 3 8 5 2 6 8 8 7 8 3
There is no 8s there that are divisible by the number on their left as well as their right.
Hence, '0' is the correct answer.

Q14. Answer: (a) 2007

Year	Same Calendar for the year
Year just after a leap year	Add 6
2^(nd) year after a leap year	Add 11
3^(rd) year after a leap year	Add 11
Leap Year	Add 28

1) 2007 → Leap year before 2007 is 2004, so 2007 is the 3^(rd) year after a leap year.
Same calendar for the year 2007 will be (2007 + 11) = 2018.
2) 2006 → Leap year before 2006 is 2004, so 2006 is the 2^(nd) year after a leap year.
Same calendar for the year 2006 will be (2006 + 11) = 2017.

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3) 2008 → It is a leap year.

Same calendar for the year 2008 will be (2008 + 28) = 2036

4) 2009 → Leap year before 2009 is 2008, so 2009 is a year after a leap year.

Same calendar for the year 2009 will be (2009 + 6) = 2015.

Hence, '2007' is the correct answer.

Q15. Answer: (c) 84/7 days

Shortcut Trick

Use the direct formula for two people working together: Time = (a × b) ÷ (a + b)

Where a = 20 days and b = 15 days.

Time taken = (20 × 15) ÷ (20 + 15) = 300 ÷ 35

Reducing the fraction: 60 ÷ 7 = 8(4/7) days.

Therefore The correct answer is 8(4/7) days.

Alternate Method

Given:

Time taken by Virat = 20 days

Time taken by Anu = 15 days

Formula Used:

Total Work = LCM of individual days

Efficiency = Total Work ÷ Time

Person	Days	Total Work	Efficiency
Virat	20	60	3
Anu	15	4	

Calculations:

=> Total Efficiency of Virat + Anu = 3 + 4 = 7 units/day

=> Total Work = 60 units

=> Time required together = Total Work ÷ Total Efficiency

=> Time = 60 ÷ 7

=> Time = 8(4/7) days

Therefore The correct answer is 8(4/7) days.

Additional Information

Work and Efficiency

Efficiency is inversely proportional to the time taken to complete a task. If A is twice as efficient as B, A takes half the time B takes.

Combined Work Formula

For three people A, B, and C, the combined time is 1/T = 1/A + 1/B + 1/C or T = (abc) ÷ (ab + bc + ca).

Pipes and Cisterns

This concept is identical to Time and Work, where an inlet pipe does positive work and an outlet pipe (leak) does negative work.

Q16. Answer: (a) 4, 5

The Correct Answer is Option 1 i.e 4, 5.

• Germanium (Ge), Arsenic (As), Antimony .(Sb), and Tellurium (Te) are the two metalloids each in period 4 and 5 of Modern Periodic Table.

• Boron (B), Silicon (Si), Germanium (Ge), Arsenic (As), Antimony (Sb), Tellurium (Te), Polonium (Po) are the metalloids.

• Metalloids are the elements with properties of both metals and nonmetals.

Q17. Answer: (d) Rs. 4,500

Shortcut Trick

Since the expenditure on food is constant, the income is inversely proportional to the percentage spent.

Initial % : New % => 33% : 27% => 11 : 9

Income ratio (Inverse) => 9 : 11

Difference in income ratio = 11 − 9 = 2 units → Rs. 1,000

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1 unit = Rs. 500 => Initial income (9 units) = 9 × 500 = Rs. 4,500
Therefore The correct answer is Rs. 4,500.
Alternate Method
Given: Initial spend = 33% | New spend = 27% | Increment = Rs. 1,000 | Food expenditure is constant.
Formula Used: Expenditure = Income × Spend %
=> Let initial income be I.
=> 33% of I = 27% of (I + 1000)
=> 33I = 27I + 27,000
=> 33I − 27I = 27,000
=> 6I = 27,000
=> I = 27,000 ÷ 6
=> I = Rs. 4,500
Therefore The correct answer is Rs. 4,500.
Additional Information
Constant Product Rule
If Product = A × B and the product is constant, then A is inversely proportional to B. If A increases by x/y, B decreases by x/(x+y).
Percentage Change
Percentage change = (Final Value − Initial Value) / Initial Value × 100.
Income and Savings
Income = Expenditure + Savings. If expenditure is fixed, any increase in income directly reflects in savings or other overheads.

Q18. Answer: (b) Concave

The correct answer is Concave.
• Myopia: A person suffering from myopia can see the near objects clearly while far objects are not clear.
• A Concave lens (diverging lens) is used by people suffering from myopia.
Additional Information
• Hypermetropia: A person suffering from hypermetropia can see distant objects clearly but not near objects.
• People suffering from hypermetropia uses a Convex lens.
• Astigmatism: This defect arises due to the difference in the radius of curvature of the cornea in the different planes
• The cylindrical lens is used by people suffering from Astigmatism.

Q19. Answer: (a) 4

Shortcut Trick
Given cot^4θ + cot²θ = 4.
Factoring out cot²θ: cot²θ (cot²θ + 1) = 4.
Using the identity 1 + cot²θ = cosec²θ, we get: cot²θ × cosec²θ = 4.
Now, cosec^4θ − cosec²θ = cosec²θ (cosec²θ − 1).
Since cosec²θ − 1 = cot²θ, the expression becomes: cosec²θ × cot²θ.
From the first part, this value is exactly 4.
Therefore The correct answer is 4.
Alternate Method
Given: cot^4θ + cot²θ = 4
Formula Used: cosec²θ − cot²θ = 1
=> cot²θ (cot²θ + 1) = 4
=> cot²θ (cosec²θ) = 4 [Since 1 + cot²θ = cosec²θ]
=> (cosec²θ − 1) (cosec²θ) = 4 [Since cot²θ = cosec²θ − 1]
=> cosec^4θ − cosec²θ = 4
Therefore The correct answer is 4.
Additional Information
Trigonometric Identity 1
The fundamental identity relating sine and cosine is: sin²θ + cos²θ = 1.
Trigonometric Identity 2

The identity relating secant and tangent is: $\sec^2\theta - \tan^2\theta = 1$.

Trigonometric Identity 3

The identity relating cosecant and cotangent is: $\text{cosec}^2\theta - \cot^2\theta = 1$.

Q20. Answer: (d) Rapid to and fro

The Correct Answer is Option 4 i.e Rapid to and fro.

• Vibration is the mechanical oscillation of an object about an equilibrium point and repeats itself over the same path in a periodic manner.

• Vibration indicates rapid to and fro motion of an object.

Q21. Answer: (b) Darwin

The correct answer is option 2 i.e Darwin.

• Darwin:

• He proposed the theory of natural selection or Darwinism.

• He explains the theory of evolution in his book "The origin of species".

• Mendel:

• He is known as the father of modern genetics.

• He discovered the fundamental laws of inheritance through his work on pea plants.

• Miller:

• He performed an experiment that may explain what occurred on primitive Earth billions of years ago

• He is referred to as the father of prebiotic chemistry.

• Urey:

• Urey was credited with the discovery of the hydrogen isotope (heavy hydrogen).

• He won the Nobel Prize in Chemistry for this discovery of heavy hydrogen.

Q22. Answer: (c) Technology driven governance

The Correct Answer is Option 3 i.e Technology driven governance.

• e-Governance:

• The “e” in e-Governance stands for ‘electronic’.

• It is simply technology-driven governance.

• It is the use of Information and Communication Technology (ICT) at all levels of the Government in order to provide services to the citizens.

• There are four types of e-governance services:

• They are Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Employee (G2E), and Government-to-Government (G2G).

Q23. Answer: (d) 1

The correct answer is Option 4, i.e 1.

• The combining capacity of an atom is known as its valency.

• Valency of an element is used to express the number of bonds that an atom is able to form being a part of a compound.

• In this, since the outer shell contains 7 electrons, it requires 1 more electron to reach the stable state.

• Hence, the Valency of the element would be 1.

Q24. Answer: (c) 101

Formula:

If $\sqrt{x} = K$, then

We can find the root in two ways first factorization method and another division method:

Calculation:

$\sqrt{10201} = \sqrt{(101 \times 101)}$

Therefore $\sqrt{10201} = 101$

Q25. Answer: (a) 0

Given

$x + y = 1$,

Formula:

$(x + y)^3 = x^3 + y^3 + 3xy (x + y)$

Calculations:

According to the question

$(x + y)^3 = x^3 + y^3 + 3xy (x + y)$

$\Rightarrow 1^3 = x^3 + y^3 + 3xy \times 1$

$\Rightarrow x^3 + y^3 + 3xy - 1 = 1 - 1$

Therefore $x^3 + y^3 + 3xy - 1 = 0$

Q26. Answer: (a) 38 : 12 : 21

Shortcut Trick

Make the common element Zinc equal in both ratios.

Ratio 1 (Copper : Zinc) = 19 : 6 (Multiply by 2 → 38 : 12)

Ratio 2 (Nickel : Zinc) = 7 : 4 (Multiply by 3 → 21 : 12)

Combined Ratio (Copper : Zinc : Nickel) = 38 : 12 : 21

Therefore The correct answer is 38 : 12 : 21.

Alternate Method

Given:

Ratio of Copper (C) to Zinc (Z) = 19 : 6

Ratio of Nickel (N) to Zinc (Z) = 7 : 4 => Ratio of Zinc (Z) to Nickel (N) = 4 : 7

Calculations:

=> To combine C : Z and Z : N, the value of Zinc must be the same.

=> LCM of 6 and 4 = 12

=> C : Z = (19 × 2) : (6 × 2) = 38 : 12

=> Z : N = (4 × 3) : (7 × 3) = 12 : 21

=> Combined Ratio C : Z : N = 38 : 12 : 21

Therefore The correct answer is 38 : 12 : 21.

Additional Information

Compound Ratio

If two ratios are a : b and c : d, then the compound ratio is (a × c) : (b × d).

Ratio Equalization

To combine ratios like A : B and B : C, multiply the terms such that the common term B has the same value in both ratios using their LCM.

German Silver Composition

Despite its name, German Silver does not contain silver; it is an alloy of Copper, Zinc, and Nickel.

Q27. Answer: (d) Neither 1 nor 2 follows

The least possible venn diagram is:

1. All pandas are white. → False (It is possible but not definite)

2. Some cats are white. → False (As, No cat is white.)

Hence, neither 1 nor 2 follows.

Q28. Answer: (c) Relative density has no unit

The Correct Answer is Option 3 i.e Relative density has no unit.

• Density:

• It is the mass per unit volume.

• SI unit of volume is the cubic meter.

• SI unit of density is kilogram per cubic meter (kg m-3).

• Areal density:

• The areal density of a two-dimensional object is calculated as the mass per unit area.

• The SI unit of area density is kg m^(−2).

• Relative density:

• It is the ratio of the density of the material to the density of water at 4^oC.

• It has no unit.

Q29. Answer: (d) 1, 5, 9; 2, 3, 6; 4, 8, 7

1, 5, 9 → All are plane 2D figures.

2, 3, 6 → All these figures have one circular face. Also these are 3D figures.

4, 7, 8 → All these figures have line of symmetry.

Hence, option '4' is the correct answer.

Q30. Answer: (b) Non - metals form cations

Option 2 is NOT correct.

• Non-metals form acidic oxides. When a non-metal reacts with oxygen it gives an oxide which on reaction with water gives an acid.

• Non-metal oxides are acidic in nature while metal oxides are basic in nature.

• Metals lose electrons to form cations (positive charge) whereas non-metals gain electrons to form anions (negative charge).

• Metals are good conductors of electricity because of a lot of free electrons while non-metals are bad conductors of electricity because they have no free electrons.

Q31. Answer: (d) 10 s

The Correct Answer is Option 4 i.e 10 s.

• Given speed of sound wave is 700 m/s.

• Given distance is 7 km i.e 7000 m.

• So time taken for the wave to travel 7 km is Distance/Speed = 7000/700 = 10 s

Q32. Answer: (c) 30 years

Shortcut Trick

Change in Total Age = (Initial Average × Number of students left) − (Increase in average × Remaining students)

Total Age of 2 students = (16 × 2) − ((16.25 − 16) × 8)

Total Age = 32 − (0.25 × 8) = 32 − 2 = 30 years.

Therefore The correct answer is 30 years.

Alternate Method

Given:

Initial number of students = 10

Initial average age = 16 years

Number of students who left = 2

New average age of 8 students = 16.25 years

Formula:

Total = Average × Number of observations

=> Total age of 10 students = 10 × 16 = 160 years

=> Remaining students = 10 − 2 = 8 students

=> Total age of 8 students = 8 × 16.25 = 130 years

=> Total age of students who left = 160 − 130 = 30 years

Therefore The correct answer is 30 years.

Additional Information

Basic Average Property

Average = Sum of all observations ÷ Total number of observations. If the average remains same after someone leaves, the age of the person who left must be equal to the initial average.

Net Deviation Method

Total Age of leaving group = (Number of persons leaving × Old Average) − (Remaining persons × Increase in Average). This accounts for the extra value shared back with the group.

Effect of Exclusion

If the average age increases after students leave, it means the students who left were younger than the class average.

Q33. Answer: (d) C

In each row, one arrow is facing east, one is facing north and one is facing south. Also, in each row, the number of arrow heads are 1, 2 and 3.

In the 3^(rd) row, one arrow is facing north, one is facing east, so definitely, the '?' figure will be facing south. Also, one image has

3 arrow heads, another has 1 arrow head, so definitely, the '?' figure will have 2 arrow heads.
All these conditions are satisfied by option 'C' image.
Hence, option '4' is the correct answer.

Q34. Answer: (a) (16, 25)

Shortcut Trick
Two numbers are Co-Prime if their Highest Common Factor (HCF) is 1.
Check options for common factors other than 1:
(12, 24) → Both divisible by 12 | (42, 49) → Both divisible by 7 | (36, 39) → Both divisible by 3.
(16, 25) → Factors of 16 (2^4) and 25 (5^2) have no common factor except 1.
Therefore The correct answer is (16, 25).
Alternate Method
Given: Pairs of numbers (16, 25), (36, 39), (42, 49), (12, 24).
Definition: Co-prime numbers are pairs of numbers that do not have any common factor other than 1.
=> For (36, 39): 36 = 3 × 12, 39 = 3 × 13. Common factor is 3. Not Co-prime.
=> For (42, 49): 42 = 7 × 6, 49 = 7 × 7. Common factor is 7. Not Co-prime.
=> For (12, 24): 12 = 12 × 1, 24 = 12 × 2. Common factor is 12. Not Co-prime.
=> For (16, 25): Factors of 16 = {1, 2, 4, 8, 16}; Factors of 25 = {1, 5, 25}. Only common factor is 1.
Therefore The correct answer is (16, 25).
Additional Information
Properties of Co-prime Numbers
Any two consecutive integers are always co-prime (e.g., 14 and 15). Any two prime numbers are always co-prime to each other.
LCM of Co-prime Numbers
The Least Common Multiple (LCM) of two co-prime numbers is always equal to their product (LCM = a × b).
Twin Primes
Twin primes are a specific type of co-prime pair where both numbers are prime and have a difference of 2 (e.g., 3, 5 or 11, 13).

Q35. Answer: (d) Either 1 or 2 alone is sufficient

1. Z has only 1 son and 1 daughter
2. X is only son of V who has 2 children's
From either statement 1 or 2, it is clear that Y is sister of X.
Hence, either 1 or 2 alone is sufficient.

Q36. Answer: (d) A

All options except 'A' has two boxes shaded, while in option 'A' only one box is shaded.
Hence, option '4' is the odd one out.

Q37. Answer: (d) 15%

Shortcut Trick
Discount = Marked Price − Selling Price = 1880 − 1598 = 282.
Discount% = (Discount ÷ MP) × 100.
Discount% = (282 ÷ 1880) × 100 = 15%.
Therefore The correct answer is 15%.
Alternate Method
Given: Marked Price (MP) = Rs. 1880, Selling Price (SP) = Rs. 1598.
Formulas: Discount = MP − SP | Discount% = (Discount ÷ MP) × 100
=> Discount = 1880 − 1598 = 282.
=> Discount Percentage = (282 ÷ 1880) × 100.
=> Discount Percentage = 15%.
Therefore The correct answer is 15%.
Additional Information
Marked Price & Discount
The Marked Price is the price printed on an item. The Discount is always calculated on the Marked Price unless otherwise stated.

Selling Price Calculation

SP = MP × (100 − Discount%) ÷ 100.

Q38. Answer: (a) (25 + 5/7) min

Shortcut Trick

Let Total Capacity be the LCM of 30, 45, and 60 = 180 units.

Efficiency of A = 180 ÷ 30 = +6; B = 180 ÷ 45 = +4; C = 180 ÷ 60 = −3.

Combined Efficiency = 6 + 4 − 3 = 7 units/min.

Time taken = Total Capacity ÷ Combined Efficiency = 180 ÷ 7 = 25 + 5/7 minutes.

Therefore The correct answer is (25 + 5/7) min.

Alternate Method

Given: Filling time A = 30 min, B = 45 min. Emptying time C = 60 min.

Person	Time (min)	Total Work	Efficiency
Pipe A	30	180	+6
Pipe B	45	+4	
Pipe C	60	−3	

Calculations:

=> Net work done in 1 minute when all pipes are open = Efficiency(A) + Efficiency(B) + Efficiency(C)

=> Net efficiency = 6 + 4 − 3 = 7 units/min

=> Total time to fill the tank = Total Work ÷ Net efficiency

=> Time = 180 ÷ 7

=> Time = 25 + 5/7 minutes

Therefore The correct answer is (25 + 5/7) min.

Additional Information

Pipes and Cisterns Logic

An inlet pipe performs positive work while an outlet (leakage) pipe performs negative work.

Net Work Formula

If pipe A fills in 'x' hours and pipe B empties in 'y' hours, net work in 1 hour = (1/x) − (1/y).

Efficiency and Time

Efficiency is inversely proportional to the time taken to complete the work (E prop. to 1/T).

Q39. Answer: (c) -1.2 ms^(-1)

The Correct Answer is Option 3 i.e -1.2 ms-1.

• Mass of bullet, M = 20g = 0.02 kg

• Mass of pistol, m = 2.5 kg

• Initial velocity of the bullet (u1) and pistol (u2) = 0

• Final velocity of the bullet, v1 = 150 ms^(-1).

• Let V be the recoil velocity of the pistol.

• The total momentum of the pistol and bullet before the fire is zero. (Since both are at rest i.e u1 and u2 is zero)

• The total momentum of the pistol and bullet after it is fired is

• = (0.02 x 150) + (2.5 x V) = (3 + 2.5V) kg ms^(-1).

• Total momentum after the fire = Total momentum before the fire

• 3 + 2.5V = 0

• V = -1.2 m/s

• Therefore, the recoil velocity of the pistol is -1.2 ms^(-1).

Q40. Answer: (b) Electric charge

The Correct Answer is Option 2 i.e. Electric Charge.

Physical Quantity	SI Unit
Resistance	Ohms

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Electric charge	Coulomb
Electric Current	Ampere
Potential difference	Volt

Q41. Answer: (a) A. R. Rahman

The Correct Answer is Option 1 i.e A.R. Rahman.

Name of the Popular singers	Their Nicknames
A. R. Rahman	Mozart of Madras Isai Puyal
Ilayaraja	Isaignani (the musical genius)
Kishore Kumar	Kishore Da
S. P. Balasubramaniam	---

Q42. Answer: (d) 6 Lakh

Given,

The company spent on various heads = Rs. 120 lakh crores

Percentage spent on loan interest = 5%

Concept:/Formula:

If total money be Rs. x and spent on certain items be y%, then

Money spent on certain items = x × y/100

Calculation:

Money spent on interest = 120 × 5/100 = 6 lakh

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

Key Point: (Implicit - suggested though not directly expressed)

I. Winters are cold and summers are hot in Nagpur

Nagpur has extreme climate → The word extreme suggests that winters are cold and summers are hot in Nagpur.

So, it is implicit.

II. Ram and Shyam are cousins

Ram's cousin Shyam → It is directly given in the statement and so it is not an assumption and specifically not an implicit assumption. It is a fact.

Hence, only assumption I is implicit.

Note:

Explicitly stated information is never considered an implicit assumption

Q44. Answer: (b) C

A, E, I, O and U are vowels.

Option images (a), (b), (d) all have vowel letters, while (c) does not have a vowel letter.

Hence, option '2' is the odd one out.

Q45. Answer: (a) Decomposition

The Correct Answer is Option 1 i.e Decomposition.

• Displacement reaction:

• In these reactions, an atom/ion present in a compound gets replaced by an atom/ion of another element.

• Example:

$FeSO_4 + Zn \rightarrow ZnSO_4 + Fe$

• Combination reaction:

• In these reactions, compounds are formed as a result of the chemical combination of two or more elements.

• Example:

$C + O_2 \rightarrow CO_2$;

$2Cu + O_2 \rightarrow 2CuO$

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• Decomposition reaction:

• In these reactions, compound either of its own or upon heating decomposes to given two or more components out of which at least one is in the elemental state.

• Example:

2NaH → Na + H2.

• Double displacement creation:

• In these reactions, two compounds exchange ions to form two new compounds.

• Example:

Na2S + 2HCL → 2NaCl + H2S.

• Precipitation:

• It is any form of solid or liquid particles that are released from the atmosphere or clouds in the form of rain, freezing rain, sleet, snow, or hail.

Q46. Answer: (d) Calcium oxide

The Correct Answer is Option 4 i.e Calcium oxide.

• Calcium oxide (CaO):

• It is commonly known as Quick lime or burnt lime.

• It is commonly used in making porcelain and glass and also in preparing bleaching powder, etc.

• Calcium carbonate (CaCO3):

• It is also known as chalk.

• Calcium carbonate is used as an antacid to relieve heartburn, acid indigestion, etc.

• Calcium chloride (CaCl2):

• It is used in the production of activated charcoal and used as an electrolyte in sports drinks.

• Calcium hydroxide Ca(OH)2:

• It is also known as slaked lime.

• It is used in sewage treatment, paper production, and food processing, etc.

Q47. Answer: (c) Martin Luther King Jr.

The Correct Answer is Option 3 i.e Martin Luther King Jr.

• Martin Luther King Jr.:

• He was the 1st President of the Southern Christian Leadership Conference.

• He was an American Christian minister.

• He delivered the famous speech, "I have a dream" around the Lincoln Memorial in Washington DC.

• Victoria Woodhull:

• She was the first female who ran for the US presidential election in 1872.

• Lucy Stone:

• She was the first Massachusetts woman to earn a college degree.

• She was a women's rights activist.

• Abraham Lincoln:

• He was the 16th president of the Unite d States.

• In 1861, he issued the Emancipation Proclamation that declared forever free those slaves who were within the Confederacy.

Q48. Answer: (d) 2

Concept:

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.

Calculation:

114 ÷ [87 – {37 – (55 – 84 ÷ 7 × 4)}]

=> 114 ÷ [87 – {37 – (55 – 12 × 4)}]

=> 114 ÷ [87 – {37 – (55 – 48)}]

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=> 114 ÷ [87 – {37 – 7}]

=> 114 ÷ [87 – 30]

=> 114 ÷ [87 – 30]

=> 114 ÷ 57

=> 2

Q49. Answer: (c) digitise and make their functioning paperless

The Correct Answer is Option 3 i.e digitise and make their functioning paperless.

• The Union Ministry of Parliamentary Affairs (MoPA) has proposed rolling out of e-Sansad in Parliament and e-Vidhan in State Legislatures to digitise and make their functioning paperless.

• It was announced by Ananth Kumar, Ministry of Parliamentary Affairs in Udaipur, Rajasthan.

• e-Sansad and e-Vidhan are the mission mode projects of Union Government under Digital India to make the functioning of Parliament and State Legislatures paperless.

Q51. Answer: (b) 480

Given,

Number of residents of a housing society own cars is = 11/16 of total residents

Number of residents of car owners have purchased covered parking space = 20/33 of the car owners

Number of residents who parked their car in open = 130

Concept:

If any fraction decreases by a/b, then,

Remaining value = (1 – a/b) × Actual value

Calculation:

Let the total number of residents of a housing society be x

Number of residents who own cars = x × 11/16 = 11x/16

=> Number of residents who have covered parking space = (11x/16) × (20/33) = 5x/12

=> Number of residents who park their car in open = 11x/16 – 5x/12 = 13x/48

According to the question

13x/48 = 130

x = 130 × (48/13)

x = 480

Therefore Number of resident in the society is 480

Q52. Answer: (a) Shri Arvind Gupta

The Correct Answer is Option 1 i.e Shri Arvind Gupta.

• Shri Arvind Gupta:

• He is an Indian toy inventor.

• He was honored with Padma Shri award 2018, in the field of Literature and Education from Maharashtra.

• He was also honored with Dr. Narendra Dabholkar Memorial Award by the Maharashtra Foundation in 2018.

• Shri Laxman Pai:

• He was born in Goa and was a painter and artist.

• He was honored with Nehru Award, Goa in 1995.

• He was also honored with the Padma Shri in 1985, in the field of Arts.

• Shri Sharda Sinha:

• She is a Maithili language folk singer.

• She was from Bihar and won the Padma Shri award 1991 in the field of Arts.

• Shri Manoj Joshi:

• He was honored with Padma Shri award 2018 in the field of Arts.

Q53. Answer: (b) Dolomite

The Correct Answer is Option 2 i.e Dolomite.

• Dolomite:

• It is a mineral composed of calcium magnesium carbonate (CaMg(CO3)2).

• It is found in Banda, Sonbhadra, and Mirzapur districts of Uttar Pradesh, Anantapur and Kurnool districts of Andhra Pradesh.
• It is used as a source of magnesia (MgO) and is also used as a soil conditioner.
• Manganese:
• It is found in Nagpur and Bhandara districts of Maharashtra and Sundargarh district, Kalahandi and Koraput districts of Odisha.
• It is primarily used in the iron and steel industry.
• Silver:
• Zawar mines in the Udaipur district of Rajasthan and Kolar Gold Fields and Hutti gold mines in Karnataka are the few silver producers mines in India.
• Iron:
• It is found in Sundargarh, Mayurbhanj, Cuttack, and Koraput districts of Odisha and Singhbhum districts of Jharkhand.
• Wrought Iron is the purest form of Iron.
• Iron is the fourth most abundant element in the Earth's crust.

Q54. Answer: (b) [figure]

3^(rd) image has brackets in such a way that the brackets are just opposite of 1^(st) image means the open portion of the brackets are in just opposite direction

Similarly,

Image option 2 has brackets in such a way that the brackets are just opposite of 2^(nd) image means the open portion of the brackets are in just opposite direction

Hence, option '2' is the correct answer.

Q55. Answer: (c) 125000

Given

1.5 ÷ 12 = 0.125

Concept:

If x ÷ y = z, then

1000x ÷ 0.00y = 100000z

Calculation:

1.5 ÷ 12 = 0.125

Therefore 1500 ÷ 0.012 = 125000

Q56. Answer: (a) 6.022×10^{23}

The correct answer is Option 1, i.e 6.022×10^{23}

Key Points

• 1 mole of a substance is equal to 6.022×10^{23} units of that substance.
• The substance can be atoms, ions, or molecules.
• The number 6.022×10^{23} is known as Avogadro's number or Avogadro's constant.
• This mole concept is used to convert between number of particles and the mass.

Q57. Answer: (b) 2

The Venn diagram that correctly represents the relationship between Females, Mothers, and Sisters is shown below:

Some mothers are sisters and all mothers and sisters are female.

Hence, option '2' is the correct answer.

Q58. Answer: (b) Edappadi K, Palanichamy

The Correct Answer is Option 2 i.e Edappadi K, Palanichamy.

• Srirangam Ranganathaswamy temple:
• Tamil Nadu Chief Minister Edappadi K, Palanichamy received the UNESCO Award of Merit awarded for the iconic Srirangam Ranganathaswamy temple in Tiruchirapalli in the year 2018.
• The temple was built in the Dravidian style of temple architecture.
• Edappadi K, Palanichamy is the current chief minister of Tamil Nadu, as of June 2020.
• M. Karunanidhi:
• He was the former chief minister of Tamil Nadu.
• He was popularly referred to as Kalaigner.

• O. Panneerselvam:
• He was the former chief minister of Tamil Nadu and the current Deputy Chief Minister of Tamil Nadu.
• J. Jayalalithaa:
• She was the former Chief Minister of the state of Tamil Nadu.
• She is commonly referred to as 'Amma'.

Q59. Answer: (d) East

If East becomes North then, North will become West and South is opposite of North South become East
Hence ‘east’ is the correct answer.

Q60. Answer: (b) C

2nd figure is a combination of the 1^(st) figure.
Similarly,
When the 3^(rd) figure is combined together, it forms a circle.
So, a full circle, i.e, image option ‘C’ will replace the ‘?’.
Hence, option 2 is the correct answer.

Q61. Answer: (c) 20 : 27

Shortcut Trick
Ratio of Volumes = (Ratio of Radii)² × (Ratio of Heights)
Ratio of Volumes = (2/3)² × (5/3)
Ratio of Volumes = (4/9) × (5/3) = 20/27
Therefore The correct answer is 20 : 27.
Alternate Method
Given:
Ratio of radii (r1 : r2) = 2 : 3
Ratio of heights (h1 : h2) = 5 : 3
Formula Used:
Volume of a cylinder (V) = $\pi r^2 h$
Calculations:
=> Let radii be 2x and 3x, and heights be 5y and 3y.
=> V1 / V2 = (π × r1² × h1) / (π × r2² × h2)
=> V1 / V2 = (r1 / r2)² × (h1 / h2)
=> V1 / V2 = (2/3)² × (5/3)
=> V1 / V2 = (4/9) × (5/3) = 20/27
Therefore The correct answer is 20 : 27.
Additional Information
Curved Surface Area (CSA)
The CSA of a cylinder is given by $2\pi rh$. The ratio of CSA is (r1/r2) × (h1/h2).
Total Surface Area (TSA)
The TSA of a cylinder includes the two circular bases: $2\pi rh + 2\pi r^2 = 2\pi r(h + r)$.
Volume of Cone
A cone with the same radius and height has 1/3 the volume of the cylinder: $V = (1/3)\pi r^2 h$.

Q62. Answer: (c) Area of cross section

The Correct Answer is Option 3 i.e Area of cross-section.
• The four factors which affect the resistance of a conductor are Resistivity, Temperature, Length, and Area of Cross Section.
• R = KρL/A. where K is a constant. If we chose convenient units then K = 1, and the formula reduces to R = ρ × L/A. Resistivity, ρ (Rho).
• Resistivity:
• It is directly proportional to the resistance of the conductor.
• Temperature:
• It is directly proportional to resistance.

• As the temperature increases, the value of resistivity increases so resistance increases.
• Length:
• It is directly proportional to the resistance.
• As the length increases the value of resistance increases.
• Area of Cross Section:
• It is inversely proportional to Resistance.
• As the area of cross section increases the value of resistance decreases.

Q63. Answer: (b) A

2^(nd) figure is made using the first figure, where circles are placed one under another.

Similarly,

3^(rd) figure is a triangle, so '? Figure will have triangles placed one under another, as shown in image option A.

Hence, option '2' is the correct answer.

Q64. Answer: (c) 8192

Concept:

Real numbers have two categories rational and irrational. If a square root is not a perfect square, then it is considered an irrational number. These numbers cannot be written as a fraction because the decimal does not end (non-terminating) and does not repeat a pattern (non-repeating).

Calculation:

√9216 = √(96 × 96) = 96 (perfect square)

√6561 = √(81 × 81) = 81 (perfect square)

√8192 = 90.509667…… (not perfect square)

√2704 = √(52 × 52) = 52 (perfect square)

Therefore 8192 is irrational square root.

Q65. Answer: (a) 135°

Shortcut Trick

For any regular polygon with n sides, each exterior angle = 360° ÷ n.

For a regular octagon, n = 8.

=> Each exterior angle = 360° ÷ 8 = 45°.

=> Each interior angle = 180° − 45° = 135°.

Therefore The correct answer is 135°.

Alternate Method

Given: Number of sides (n) = 8 (Regular Octagon).

Formula Used: Each interior angle = [(n − 2) × 180°] ÷ n

=> Sum of all interior angles = (8 − 2) × 180°

=> Sum = 6 × 180° = 1080°

=> Measure of each interior angle = 1080° ÷ 8

=> Each interior angle = 135°

Therefore The correct answer is 135°.

Additional Information

Sum of Exterior Angles

The sum of the exterior angles of

Q66. Answer: (a) 96 km/hr

Shortcut Trick

Speed and Time are inversely proportional for a constant distance (S1 × T1 = S2 × T2).

Ratio of Time = 8 : 5

Ratio of Speed = 5 : 8

Given 5 units = 60 km/hr => 1 unit = 12 km/hr

Therefore 8 units = 8 × 12 = 96 km/hr.

Therefore The correct answer is 96 km/hr.

Alternate Method
Given: Initial Speed (S1) = 60 km/hr, Initial Time (T1) = 8 hours, New Time (T2) = 5 hours.
Formula Used: Distance = Speed × Time
=> Distance = S1 × T1
=> Distance = 60 × 8 = 480 km
=> New Speed (S2) = Distance ÷ T2
=> S2 = 480 ÷ 5
=> S2 = 96 km/hr
Therefore The correct answer is 96 km/hr.
Additional Information
Inverse Proportion Law
When distance is constant, the speed of an object is inversely proportional to the time taken (S prop. to 1/T).
Average Speed
Average speed is calculated as Total Distance ÷ Total Time taken during the entire journey.
Unit Conversion
To convert km/hr to m/s, multiply by 5/18. To convert m/s to km/hr, multiply by 18/5.

Q67. Answer: (a) A

The correct mirror image of the figure is shown below:
Hence, option 1 is the correct answer.

Q68. Answer: (a) Sachin Siwach

The Correct Answer is Option 1 i.e Sachin Siwach.
• Sachin Siwach:
• He is an Indian boxer who hails from Bhiwani, Haryana.
• He is considered as an Indian boxing prodigy.
• He became the third Indian to win gold at the World Youth Championship.
• He was selected as Youth Boxer of the year 2017, by Asian Confederation of Youth Boxing.
• Ali Qamar:
• He is the present Chief Coach of the Indian Women Boxing team.
• He won India's first Commonwealth Games gold medal in boxing at the 2002 Commonwealth Games held in Manchester.
• Jitender Kumar:
• He is an Indian flyweight boxer.
• He won the bronze medal in the flyweight category at the 2006 Commonwealth Games.
• Akhil Kumar:
• He won the gold medal at the 4th Commonwealth Federation Boxing Championships (2005), held in Scotland.
• He won the gold medal in the Bantamweight 54 kg category at the 2006 Commonwealth Games.
• He was also awarded the Arjuna award in 2005.

Q69. Answer: (c) 60%

Shortcut Trick
Total students = Pass + Fail = 150 + 100 = 250
Pass % = (Passed Students ÷ Total Students) × 100
Pass % = (150 ÷ 250) × 100 = 3/5 × 100 = 60%
Therefore The correct answer is 60%.
Alternate Method
Given:
Number of students who Passed = 150
Number of students who Failed = 100
Formula Used:
Percentage = (Part value ÷ Total value) × 100
Calculations:
=> Total number of students who attended the examination = 150 + 100 = 250

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=> Required Pass Percentage = (150 ÷ 250) × 100

=> Required Pass Percentage = (15 ÷ 25) × 100

=> Required Pass Percentage = 0.6 × 100 = 60%

Therefore The correct answer is 60%.

Additional Information

Percentage Calculation

To find the percentage of a specific category, always divide that category's value by the sum total of all categories in the data set.

Fail Percentage

Fail % = (Failed Students ÷ Total Students) × 100. In this case: (100 ÷ 250) × 100 = 40%.

Percentage Complement

If there are only two outcomes (Pass/Fail), then Pass % + Fail % = 100%.

Q70. Answer: (d) 15

Given,

Number of families who participate in survey = 170

Number of families who drink Coffee = 115

Number of families who drink Tea = 110

Number of families who drink Milk = 130

Number of families who drink Coffee and Milk = 85

Number of families who drink Coffee and Tea = 75

Number of families who drink Tea and Milk = 95

Number of families who drink Coffee, Milk and Tea = 70

Calculation:

Number of families who drink only Milk and Tea = 95 – 70 = 25

Number of families who drink only Coffee and Milk = 85 – 70 = 15

Q71. Answer: (c) gravitational force

The Correct Answer is Option 3 i.e gravitational force.

Key Points

• Gravitational force: Everybody attracts another body by a force i.e force of attraction between two objects is called the force of gravitation.

• Centripetal force is the force acting towards the center of the circular path.

• Centrifugal force acts in a direction pointing away from the center of the circular path.

• Electromagnetic force: It is a type of force that occurs between electrically charged particles.

Q72. Answer: (d) L

The logic is:

Hence, ‘L’ is the correct answer.

Q73. Answer: (d) YTILAUQ

The logic is:

Similarly,

Hence, ‘YTILAUQ’ is the correct answer.

Q74. Answer: (a) 1527

The Correct Answer is Option 1 i.e 1527.

• Battle of Khanwa:

• It was fought between the Mughal founder Babur and Rajput ruler Rana Sanga.

• It was fought in the year 1527 near the village of Khanwa, in Bharatpur District of Rajasthan.

• The battle was won by Babur.

• Babur assumed the title of Ghazi after the victory in the Battle of Khanwa.

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Q75. Answer: (b) Only assumption I is implicit

(Implicit - suggested though not directly expressed)

I. Every crime has a cause.

The words 'root cause' in the statement suggests that every crime has a cause.

II. There are crimes in every situation.

It is not suggested in the statement.

Hence, only assumption I is implicit

Q76. Answer: (d) Arvind Parikh

The Correct Answer is Option 4 i.e Arvind Parikh.

• Arvind Parikh:
• He was an Indian Classical Sitar Player.
• He was awarded Padma Bhushan in the field of Art Music from Maharashtra in 2018.
• He was also awarded the Sangeet Natak Akademi Award for Hindustani Music - Instrumental (Sitar) in the year 2004.
• AR Rehman:
• He is an Indian Music Producer and singer.
• He was awarded Padma Bhushan in the field of Art Music from Tamil Nadu in 2010
• He was Padma Shri in the field of Arts from Tamil Nadu in 2000.
• SP Balasubrahmanyam:
• He is an Indian playback singer.
• He was awarded Padma Shri in the field of Arts from Andhra Pradesh in 2001.
• Ilaiyaraaja:
• He was awarded Padma Bhushan in the field of Arts from Tamil Nadu in 2010.
• He was also awarded Padma Vibhushan in the field of Arts from Tamil Nadu in 2018.

Q77. Answer: (b) 64

Calculation:

Total students who play game N = Students playing only N + Students playing M and N + Students playing N and L + Students playing all three games

Therefore Total number of students who play the game N = 8 + 6 + 9 + 41 = 64

Q78. Answer: (d) Sumatra

The Correct Answer is Option 4 i.e Sumatra.

• Sunda Strait:
• It lies between two Islands.
• It is the strait between the Indonesian islands of Java and Sumatra.
• Sumatra Island is the 6th largest island in the world.
• It is a link between the Java Sea and the Indian Ocean.
• Borneo:
• It is the third-largest island in the world.
• It is located in Southeast Asia.
• Sulawesi:
• It is one of the main islands of Indonesia.
• It is one of the four Greater Sunda Islands (Java, Sumatra, Borneo and Sulawesi).
• Maluku:
• The Maluku Islands are an archipelago in Indonesia.
• The islands were known as the Spice Islands.

Q79. Answer: (a) Ashwani Kumar

The Correct Answer is Option 1 i.e Ashwani Kumar.

• Ashwani Kumar:
• He was the Former Member of Parliament, Rajya Sabha.
• He was conferred with Japan's imperial decoration Order of the Rising Sun award for his contribution toward fostering

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Japan-India ties in the year 2017.
• Sushma Swaraj:
• She was a former Minister of External Affairs of India.
• She was conferred with Padma Vibhushan (posthumously) in 2020 in the field of Public Affairs.
• Suresh Prabhu:
• He was the former Minister of Railways, Minister of Commerce & Industry, and Civil Aviation.
• He was the Minister of Railways in 2016, who presented the 2016 Rail Budget.
• Nirmala Sitharaman:
• She is the current Minister of Finance and Corporate Affairs of India.
• She is the second female Finance Minister after Indira Gandhi
• She is the first full-time female Finance Minister.

Q80. Answer: (d) -4

Concept:
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.
Calculation:
32 ÷ (20 – 12 ÷ 3 × 7)
=> 32 ÷ (20 – 4 × 7)
=> 32 ÷ (20 – 28)
=> 32 ÷ (-8)
=> (-4)

Q81. Answer: (d) Athletics

he Correct Answer is Option 4 i.e Athletics.T

Famous Indian athletics	**Anju Bobby George Dutee Chand Krishna Poonia Mohinder Singh Gill Milkha Singh Khushbir Kaur**
Famous Indian tennis players	Leander Paes Sania Mirza Mahesh Shrinivas Bhupathi Yuki Bhambri Rohan Bopanna
Famous Indian Cricketers	Ravishankar Shastri M.S.Dhoni Virat Kohli Yuvraj Singh Ravindra Jadeja Saurav Ganguly Karun Nair
Famous Indian Basket Ball players	Vishesh Bhriguvanshi Prashanti Singh Geethu Anna Jose Satnam Singh

Q82. Answer: (d) Trees

The logic is:
Neck : Head → The head of a human or an animal or any living being is above its neck.
Similarly,
Ground : → Trees grow above ground.
Hence, ‘trees’ is the correct answer.

Q83. Answer: (a) 98 u

The Correct Answer is Option 1 i.e 98 u.
• The atomic mass of Hydrogen is 1, Sulfur is 32 and Oxygen is 16.
• Molecular mass of H2SO4 is 1 x 2 (Hydrogen 2 atoms) + 32 x 1 (Sulphur 1 atom) + 16 x 4 (Oxygen 4 atoms) = 2+32+64 = 98 u

Q84. Answer: (b) B

The correct mirror image of the figure is shown below:
Hence, option 2 is the correct answer.

Q85. Answer: (a) Seychelles

The Correct Answer is Option 1 i.e Seychelles.

• Seychelles:

• It is a country in East Africa.

• The 24th Conference of Speakers and Presiding Officers of the Commonwealth (CSPOC) was held in Victoria, Seychelles in the year 2018.

• An Indian Parliamentary delegation led by Lok Sabha Speaker Sumitra Mahajan.

• The 25th Conference of Speakers and Presiding Officers of the Commonwealth (CSPOC) was held in Canada.

• An Indian Parliamentary delegation led by Lok Sabha Speaker Om Birla.

• Srilanka:

• Ranil Wickremesinghe is the current president of Srilanka.

• Sri Jayewardenepura is the capital of Srilanka.

• Djibouti:

• It is a country in East Africa.

• It is bordered by Somalia, Ethiopia, Eritrea, Red Sea, and the Gulf of Aden in the east.

• Mauritius:

• It is an Island Nation in East Africa.

• Pravind Jugnauth is the current PM of Mauritius.

Q86. Answer: (a) Polyvinyl chloride

The Correct Answer is Option 1 i.e Polyvinyl Chloride.

• Polyvinyl chloride ((C2H3Cl)_n):

• PVC stands for Polyvinyl chloride.

• It is widely used as a thermoplastic.

• It is a synthetic polymer made from the polymerization of vinyl chloride.

• It comes in two basic forms i.e rigid and flexible.

• Because of its hardness, it is used in a variety of applications in the building and construction, health care, automobiles, etc.

Q87. Answer: (a) 62

Symbol	•	÷	•	×
Meaning	÷	•	×	•

Given expression: 42 + 6 ÷ 5 – 3 × 70 = m

After replacing the symbols by their meaning, we get:

L.H.S = 42 ÷ 6 - 5 × 3 + 70

= 7 – 15 + 70

= 77 – 15

= 62

m = 62

Hence, ‘62’ is the correct answer.

Q88. Answer: (c) 77√3

Concept:

If x = a × a × b × b

=> √x = ab

Calculation:

7√48 + 7√147

=> 7√(2 × 2 × 2 × 2 × 3) + 7√(3 × 7 × 7)

=>7 × 2 × 2 √3 + 7 × 7 × √3

=>28√3 + 49√3

=> 77√3

Q89. Answer: (b) Human heart is the size of an open hand

Correct Option: 2

Option 1: True

Blood flows at high pressure in arteries as the blood flows by the pumping pressure of the heart.

Option 2: False

Adult's hearts are about the size of 2 fists and children's hearts are about the size of one adult fist.

Option 3: True

• Plasma is a straw-colored, viscous fluid constituting nearly 55 percent of the blood.

• 90-92 percent of plasma is water and proteins contribute 6-8 percent of it.

Option 4: True

• Around 7–8% of an adult's body weight is blood.

• So, the correct answer is option 2.

Q90. Answer: (d) 210 J

The Correct Answer is Option 4 i.e 210 J.

• Mass of luggage (m) = 14 kg

• Height of luggage (h) = 1.5 m

• Work done = m x g x h

• = 14 x 10 x 1.5

• = 210 J

• Therefore work done by him on the luggage is 210 J.

Q91. Answer: (d) (9)/16

Shortcut Trick

Given expression: $(1 + \cos A)(1 - \cos A) / (1 + \sin A)(1 - \sin A)$

Using identity $(a + b)(a - b) = a^2 - b^2$: $(1 - \cos^2 A) / (1 - \sin^2 A)$

Using $1 - \cos^2 A = \sin^2 A$ and $1 - \sin^2 A = \cos^2 A$: $\sin^2 A / \cos^2 A = \tan^2 A$

Given $\tan A = 3/4 \Rightarrow \tan^2 A = (3/4)^2 = 9/16$

Therefore The correct answer is 9/16.

Alternate Method

Given: $\tan A = 3/4$

Formula Used: $\sin^2 \theta + \cos^2 \theta = 1$; $(a + b)(a - b) = a^2 - b^2$

=> In a right triangle, let Perpendicular (P) = 3 and Base (B) = 4

=> Hypotenuse (H) = $\sqrt{(3^2 + 4^2)} = \sqrt{(9 + 16)} = \sqrt{25} = 5$

=> Expression = $(1 - \cos^2 A) / (1 - \sin^2 A)$

=> $\sin A = P/H = 3/5$ and $\cos A = B/H = 4/5$

=> Expression = $(1 - (4/5)^2) / (1 - (3/5)^2)$

=> $(1 - 16/25) / (1 - 9/25) = (9/25) / (16/25) = 9/16$

Therefore The correct answer is 9/16.

Additional Information

Trigonometric Identities

Fundamental identities include $\sin^2 \theta + \cos^2 \theta = 1$, $1 + \tan^2 \theta = \sec^2 \theta$, and $1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$.

Pythagorean Triplets

Common triplets like (3, 4, 5), (5, 12, 13), and (8, 15, 17) help in quick calculation of sides in right-angled triangles.

Q92. Answer: (c) Only argument I is strong

(Argument – a reason or set of reasons given in support of an idea, action or theory)

I. Yes, we should remove clutter and stagnant water.

We should use mosquito repellents and other gadgets to prevent mosquito bites.

Yes, because mosquitoes lay eggs in stagnant water, so removing clutter and stagnant water will not help in mosquitoes reproductions. Also, mosquito repellents and other gadgets are used to prevent mosquito bites.

Therefore, argument I is strong.

II. No, it is not possible to avert mosquitoes. They will come in particular season and breed.

We can try preventive measures.
Using preventive measures will stop the entire breeding process of mosquitoes.
Therefore, argument II is not strong.
Hence, only argument I is strong.

Q93. Answer: (d) Profit, 20%

Shortcut Trick
If 90% (100% − 10% loss) represents Rs. 72.
Then, the value of Rs. 96 in percentage = (90 ÷ 72) × 96%.
Value = 1.25 × 96% = 120%.
Since 120% > 100%, Gain% = 120% − 100% = 20%.
Therefore The correct answer is Profit, 20%.
Alternate Method
Given → Selling Price (SP1) = Rs. 72, Loss% = 10%, New Selling Price (SP2) = Rs. 96.
Formulas: CP = SP × (100 ÷ (100 − Loss%)) | Gain% = ((SP − CP) ÷ CP) × 100
=> Cost Price (CP) = 72 × (100 ÷ 90) = Rs. 80.
=> At SP2 = Rs. 96, Profit = 96 − 80 = Rs. 16.
=> Profit% = (16 ÷ 80) × 100 = 20%.
Therefore The correct answer is Profit, 20%.
Additional Information
Cost Price & Selling Price
The Cost Price is the base (100%) for calculating profit or loss percentages unless otherwise specified.
Profit and Loss Percentage
Profit occurs when SP > CP, and Loss occurs when CP > SP. Formula: Profit% = (P ÷ CP) × 100.

Q94. Answer: (c) non-living cell

The Correct Answer is Option 3 i.e non-living cell.
• Sclerenchyma:
• It is a simple permanent plant tissue.
• It provides mechanical stiffness and strength to the plants.
• It is composed of dead cells i.e non-living cells.
• WBCs:
• White Blood Cells (WBCs) protect our body from foreign substances.
• Leukemia is a type of blood cancer, caused by an increase in the number of white blood cells in the body.
• RBCs:
• These are also called erythrocytes.
• Red blood cells are made in the bone marrow.
• Hemoglobin is the protein inside red blood cells that carries oxygen.

Q95. Answer: (d) 900 J

The Correct Answer is Option 4 i.e 900 J.
• Mass (M) = 2 kg
• Velocity (V) = 30 ms-1
• Kinetic Energy = 1/2 × M × V2
• = 1/2 × 2 × 30 × 30
• = 1/2 × 2 × 900
• = 1800/2
• = 900 J
• Therefore the kinetic energy of a ball of mass 2 kg moving with a speed of 30 ms^(-1) is 900 J.

Q96. Answer: (d) 7

Shortcut Trick
Net efficiency = Pipe A + Pipe B − Pipe C

Total work (LCM of 7, 10.5, 6) = 42 units
Combined efficiency = 6 + 4 − 7 = 3 units/hour
Half-full cistern remaining work = 21 units
Time required = 21 ÷ 3 = 7 hours
Therefore The correct answer is 7 hours.
Alternate Method

Pipe	Time (hours)	Total Capacity	Efficiency
Pipe A (Inlet)	7	42 units	+6
Pipe B (Inlet)	10.5	+4	
Pipe C (Outlet)	6	−7	

Given: Filling time for Pipe A = 7 hrs, Pipe B = 10.5 hrs, and Emptying time for Pipe C = 6 hrs.
=> Total capacity = LCM (7, 10.5, 6) = 42 units.
=> Efficiency of A = 42 ÷ 7 = 6 units/hr.
=> Efficiency of B = 42 ÷ 10.5 = 4 units/hr.
=> Efficiency of C = 42 ÷ 6 = −7 units/hr (negative as it is an outlet pipe).
=> Combined efficiency of (A + B + C) = 6 + 4 − 7 = 3 units/hr.
=> Capacity to be filled (cistern is half-full) = 42 ÷ 2 = 21 units.
=> Time required = Remaining Capacity ÷ Combined Efficiency = 21 ÷ 3 = 7 hours.
Therefore The correct answer is 7 hours.
Additional Information
Inlet and Outlet Pipes
Inlet pipes fill the tank (positive work), while outlet pipes (leaks) empty the tank (negative work).
Net Work Calculation
Net Work done per hour = Σ(Inlet efficiencies) − Σ(Outlet efficiencies).
Fractional Filling
If a tank is x/y full, the work remaining to fill it completely is (1 − x/y) × Total Capacity.

Q97. Answer: (c) both mass and velocity of an object

The Correct Answer is Option 3 i.e both mass and velocity of the object.
Key Points
• Momentum:
• It is the property of a moving body and is defined as the product of mass and velocity of the body.
• SI unit is kg×m/s.
• Dimension: MLT^(−1)
• p = mv; p = momentum, m = mass, and v = velocity
• So the momentum of a body depends upon both mass and velocity of the body.

Q98. Answer: (c) Rs. 62,500

Shortcut Trick
Rate of interest = 8% = 2/25
Ratio of Principal (P) to Amount (A) for 1 year = 25 : (25 + 2) = 25 : 27
For 2 years, Ratio P : A = $(25)^2 : (27)^2$ = 625 : 729
Given, 729 units = Rs. 72,900 => 1 unit = Rs. 100
Value of X (Principal) = 625 units = 625 × 100 = Rs. 62,500
Therefore The correct answer is Rs. 62,500.
Alternate Method
Given:
Principal (P) = Rs. X
Time (T) = 2 years
Rate of Interest (R) = 8% per annum
Total Amount (A) = Rs. 72,900

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Formula Used:

Amount (A) = P(1 + R/100)^T

Calculations:

=> 72,900 = X × (1 + 8/100)²

=> 72,900 = X × (1 + 2/25)²

=> 72,900 = X × (27/25)²

=> 72,900 = X × (729/625)

=> X = (72,900 × 625) ÷ 729

=> X = 100 × 625

=> X = 62,500

Therefore The correct answer is Rs. 62,500.

Additional Information

Effective Rate of Interest

For two successive years at rate r%, the effective compound interest rate is calculated as r + r + (r × r)/100 %.

Compound Interest vs Simple Interest

The difference between CI and SI for 2 years is given by the formula: Difference = P(R/100)².

Quarterly/Half-Yearly Compounding

If interest is compounded half-yearly, the rate is halved (R/2) and the time is doubled (2n) in the standard formula.

Q99. Answer: (a) 8

Shortcut Trick

Apply the Chain Rule formula: M1 × D1 = M2 × D2

34 × 12 = 51 × D2

D2 = (34 × 12) ÷ 51 = 2 × 4 = 8 days.

Therefore The correct answer is 8 days.

Alternate Method

Given:

Initial Men (M1) = 34

Initial Days (D1) = 12

Final Men (M2) = 51

Formula Used:

Total Work = Men × Days

Calculations:

=> Total Work = 34 × 12 = 408 units

=> Required Days (D2) = Total Work ÷ M2

=> D2 = 408 ÷ 51

=> D2 = 8 days

Therefore The correct answer is 8 days.

Additional Information

Man-Day Concept

The amount of work is proportional to the number of men and the time taken. If work (W) is constant, then M1D1 = M2D2.

General Chain Rule

For different work amounts and hours: (M1 × D1 × H1) ÷ W1 = (M2 × D2 × H2) ÷ W2.

Inverse Variation

Men and Days are in inverse variation; as the number of workers increases, the time required to finish the work decreases.

Q100. Answer: (a) Mentor India campaign

The Correct Answer is Option 1 i.e Mentor India campaign.

• In an attempt to discover young talent, NITI Aayog, India's premier think-tank has launched the Mentor India campaign in the year 2017.

• Mentor India Campaign is an initiative to engage leaders who can guide and mentor students at more than 900 Atal Tinkering Labs.

• The campaign aims at maximising the impact of Atal Tinkering Labs by engaging leaders who can nurture and guide students at

Atal Tinkering Labs.

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