RRC Group D Previous Year Paper 45 (Held On: 6 Dec 2018 Shift 2)

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

Take this paper as a timed mock test

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CBT

Q1. Brazen can paint a wall red in 12 days, while Ballary can paint the entire wall in 21 days. If Brazen and Ballari work alternately for one day each from painting the wall to coloring it red, then how many days will it take to paint the entire wall red?

(a) 16 days
(b) 15 days
(c) 14 days
(d) 12 days

Q2. Find the missing term in this series.

11, 12, 13, 23, _____, 34, 19, 45, 23

(a) 14
(b) 16
(c) 15
(d) 17

Q3. Which of the following number is divisible by 9?

(a) 29039
(b) 19239
(c) 17139
(d) 31239

Q4. An investment of Rs 3000 at a 30% annual rate of interest compounding every four months will yield an amount of Rs. _____ in a year.

(a) 3993
(b) 3990
(c) 3981
(d) 3900

Q5. Which day was 25 January 1948?

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

Q6. The Central Government has enacted a new law - the Child Labor Amendment Act, 2016 - banning employment of children below _____ years in all occupations and procedures.

(a) 18
(b) 17
(c) 14
(d) 12

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Q7. Which of the following is sin (90° – θ)?

(a) sin θ
(b) cot θ
(c) cos θ
(d) cosec θ

Q8. How many factors of 2^8 × 3² × 5³ × 7^5 are even numbers?

(a) 576
(b) 288
(c) 168
(d) 464

Q9. If the momentum of an object increases by 20%, its kinetic energy will increase by _____.

(a) 66%
(b) 77%
(c) 44%
(d) 55%

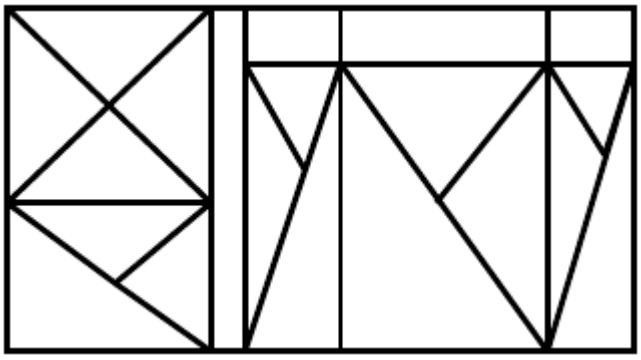
Q10. If North-West is called North, what will West be called?

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

Q11. If in the word INCOMPREHENSIBILITIES, the first and the second, third and fourth .... etc. letters are interchanged with each other, what will be the fifteenth letter from the left side?

(a) M
(b) I
(c) R
(d) L

Q12. How many triangles are present in the picture below?



(a) 27
(b) 22
(c) 25
(d) 21

Q13. _____ is a horticultural crop.

(a) Rice
(b) Wheat
(c) Tea
(d) Peanut

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Q14. Consider the given statement and decide which of the given assumptions is implicit in the given statement.

Statement:

An advertisement in the newspaper - Managing Director of Bank XYZ said, "We do not send messages to customers nor make calls to make any corrections, updates to bank account details"

Assumption:

(I) People are getting fake calls for stealing bank account details

(II) Bank officials call customers to change ATM PIN

(a) Neither I nor II is implicit
(b) Only I is implicit
(c) Only II is implicit
(d) Either I or II is implicit

Q15. _____ are parts of the stamens.

(a) Anthers and Suppository
(b) Anther and ovary
(c) Anthers and Filaments
(d) Anthers and Stigma

Q16. A train traveling at a speed of 66 km/hr crosses a 465 m long bridge in 33 seconds. How long was the train?

(a) 240 m
(b) 160 m
(c) 180 m
(d) 140 m

Q17. The action of heating ores in the presence of oxygen is called

(a) Roasting
(b) Calcination
(c) Corrosion
(d) Extraction

Q18. Select the appropriate combination of symbols that will be placed sequentially in place of the question mark (?) In the given equation, which will complete the equation correctly.

[(100 ? 2) ? 2] ? 10 = 59

(a) –, ÷, +
(b) –, ×, ÷
(c) +, ×, ×
(d) +, ÷, ÷

Q19. Which of the following matches is correct?

(a) Butene : CH3 - CH2 - CH = CH2
(b) Propane : CH3 - CH2 = CH2
(c) Pantene : CH3 - CH2 - CH - CH = CH2
(d) Ethane : CH2 = CH3

Q20. _____ won the 60th Grammy Award in the Best New Artist category.

(a) Kendrick Lamar
(b) Ed Sheeran
(c) Ray Charles
(d) Alessia Cara

Q21. Which of the following is denser than the density of water?

(a) Iron nail
(b) Ice
(c) Cork

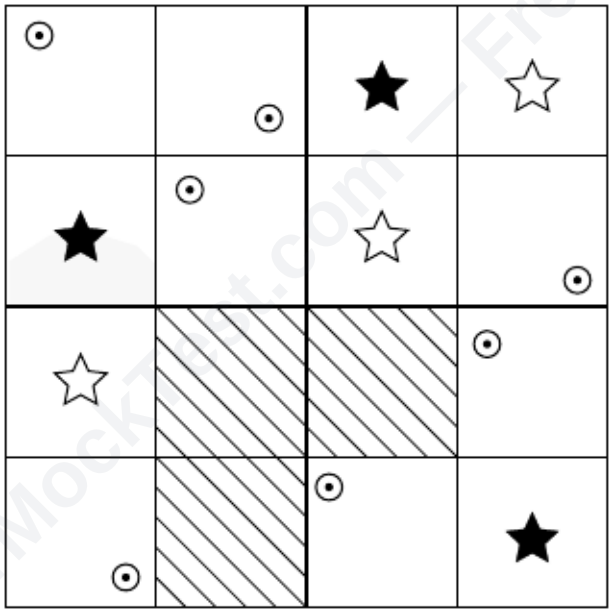
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(d) Thermocol

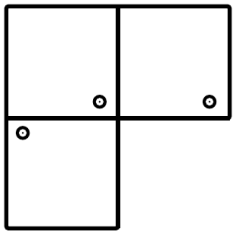
Q22. Which of the following number is the square root of 35721?

(a) 171
(b) 201
(c) 179
(d) 189

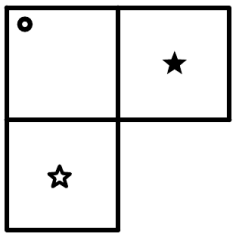
Q23. Which answer figure will replace the shaded area correctly?



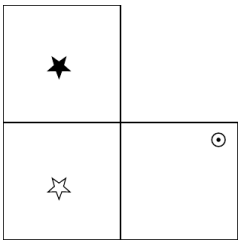
(a)



(b)

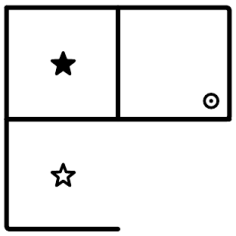


(c)



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(d)



Q24. At what time does the mirror image of the clock show the time of 3:00 AM?

(a) 9:00 AM
(b) 6:00 AM
(c) 3:00 AM
(d) 3:30 AM

Q25. What are the elements with lanthanum in Group 3, period 6 called?

(a) Halogens
(b) Transition Elements
(c) Actinoid
(d) Lanthanoid

Q26. Read the given statements and conclusions and decide which of the following conclusions logically follow the statement.

Statements:

A. All leopards are lions.

B. Some tigers are leopards.

Conclusions:

I. Some tigers are lions.

II. No lion is tiger

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

Q27. Which of the following is not an animal tissue?

(a) Epithelial tissue
(b) Muscle tissue
(c) Parenchyma
(d) Connective tissue

Q28. Consider the following statements, even if they vary from commonly known facts and decide which conclusions logically follow the statement.

Statements:

All D are V.

Some S are D.

No W is S.

Conclusions:

I. Some W is not D.

II. Some V are S.

III. Some D are S.

(a) Only I follows
(b) All conclusions I, II and III follow
(c) Only II and III follow

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(d) Only III follows

Q29. What will be the next term in the following category?
AD4, GJ10, MP16, _____.

(a) VS22
(b) SV22
(c) SV21
(d) SV23

Q30. Triple Talaq is related to which of the following?

(a) Divorce
(b) Education
(c) Marriage
(d) Dowry

Q31. The stem or root circle grows due to _____.

(a) Lateral meristem
(b) Calary meristem
(c) Intercalary meristem
(d) Apical meristem

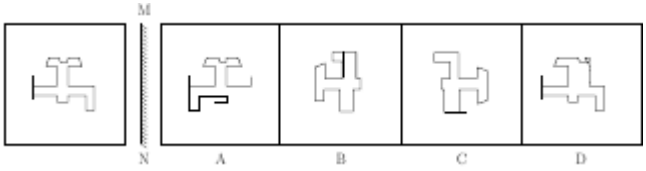
Q32. In which country was the world's first robot ski competition held?

(a) India
(b) Switzerland
(c) South Korea
(d) Russia

Q33. Two bodies of mass m and 9 m are moving with equal kinetic energy. The ratio of their linear momentum will be _____.

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

Q34. Select the mirror image of the following figure.



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

Q35. If in a certain code language, PLANT is coded as QMBOU, then in that code language what will be the code for TOYOTA?

(a) PUZUBP
(b) UPZPUB
(c) UPSZPU
(d) ZPUBPU

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Q36. Which of the following numbers will have the square root rational?

(a) 46232
(b) 34225
(c) 14448
(d) 46233

Q37. Manoj was running towards the south-west direction. Pankaj was walking in the opposite direction. Which direction was Pankaj going?

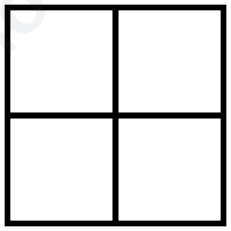
(a) South-West
(b) North-West
(c) South-East
(d) North-East

Q38. An object moves in a straight line when the machine provides continuous power. The distance traveled by the object in time 't' will be proportional to _____.

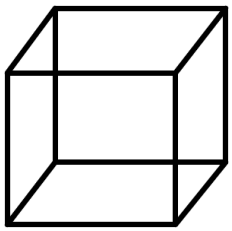
(a) t^(3/4)
(b) t^(1/2)
(c) t^(3/2)
(d) t^(1/4)

Q39. Find the odd diagram.

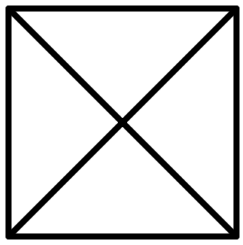
(a)



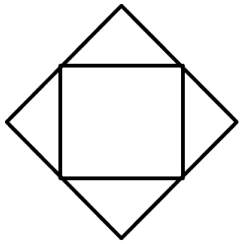
(b)



(c)



(d)



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Q40. What is the relative tendency of an atom to attract electrons when it is bound to another atom?

(a) Electronegativity
(b) Electron attraction
(c) Quantum energy
(d) Ionization energy

Q41. Calculate the relative molecular mass of CO2.

(a) 46 u
(b) 44 u
(c) 40 u
(d) 45 u

Q42. _____ controls involuntary activities like coughing and sneezing.

(a) Medulla
(b) Cerebrum
(c) Pons
(d) Cerebellum

Q43. The ratio of the present ages of X and Y is 3 : 8 while the ratio of the present ages of Y and Z is 4 : 5. Two years ago the age ratio of X and Y was 1 : 3. What is the sum of the present ages of the three?

(a) 126 years
(b) 105 years
(c) 63 years
(d) 84 years

Q44. The numerical value of the area of a square is equal to half the numerical value of each of its diagonals. What is the numerical value of diagonal?

(a) √2/2
(b) √2
(c) 1
(d) 2

Q45. This compound is sometimes added to the food for quick cooking. It is a mild non-corrosive alkali. The reaction given below shows the action of its formation. Name this compound.

NaCI + H2O +CO2 +NH3=?

(a) Sodium Hydrogen Carbonate
(b) Ammonium Carbonate
(c) Sodium Carbonate
(d) Ammonium Chloride

Q46. The length of the diagonals of a rhombus is 16 cm and 12 cm. What is the perimeter of the rhombus?

(a) 56 cm
(b) 28 cm
(c) 26 cm
(d) 40 cm

Q47. The chemical formula of Quick Lime (Kalichuna) is _____.

(a) CaCO3
(b) CaCI2
(c) Ca(OH)2
(d) CaO

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Q48. Which figure will fill in the blanks and complete the series correctly?

< ? ? > ____

(a) ><<
(b) <>
(c) >>>
(d) >>

Q49. Which of the following statements is not correct regarding matter?

(a) Matter is made up of particles.
(b) There is a difference between particles of matter.
(c) There is no attraction force between particles of matter.
(d) The particles of matter move continuously in fluid and air.

Q50. In the formula M = h_i/h_o, what do m, h_iand h_o represent?

(a) M – Mass, h_i – Height of reflection, h_o - Height of object
(b) M – Magnification, h_i – Height of object, h_o - Height of reflection
(c) M – Magnification, hi – Height of reflection, ho - Height of object
(d) M – Mass, hi –Height of object, ho - Height of reflection

Q51. V is the son of K and M. M is the son of H and G. H and G are _____ of V.

(a) Mother-Father
(b) Grandmother-Grandfather
(c) Uncle
(d) Grandmother-Grandfather (Maternal)

Q52. You have to decide which of these assumptions are implicit in the statement, considering the statement and the assumptions given thereafter.

Statement:

I cannot contact you by e-mail from Krishna's house.

Assumptions:

I. Internet facility is not available at Krishna's house.

II. Nowadays it has become difficult to contact people on e-mail.

(a) Only assumption I is implicit
(b) Only assumption II is implicit
(c) Neither assumption I nor II is implicit
(d) Either assumption I or II is implicit

Q53. A sum at the same simple interest becomes amount to Rs. 457 in 5 years and Rs. 574 in 10 years. Find the value of the sum (in Rupees).

(a) 340
(b) 420
(c) 500
(d) 280

Q54. What is the full form of CIBIL?

(a) Central Information Bureau India Limited
(b) Code Information Bureau India Limited
(c) Credit Information Bureau India Limited
(d) Commercial Information Bureau India Limited

Q55. You are given a question and two statements. Find out which statement is necessary / sufficient to answer the question.

Question:

How many pages of crime novel did Katir read on Saturday?

Statement:

I: Katir read the last 50 pages of the book on Sunday morning.

II. The book contains 450 pages, of which two-thirds of the pages were read before Saturday.

(a) The collected information of both I and II statements is necessary
(b) Only statement II is sufficient
(c) Only statement I or statement II alone is sufficient
(d) Only statement I is sufficient

Q56. Kanchenjunga is the highest peak in India situated in _____.

(a) Uttarakhand
(b) Arunachal Pradesh
(c) Himachal Pradesh
(d) Sikkim

Q57. What will come in the place of the question mark '?' in the following question?

4.5 – [2 – 0.25 {4 – 6 ÷ (2.7 – 0.7)}] = ?

(a) 2.75
(b) 3.00
(c) 2.50
(d) 3.25

Q58. Find the missing number in the given series.

22, 4, 26, 8, 30, 12, 34, 16, 38, ?

(a) 20
(b) 24
(c) 34
(d) 42

Q59. A can do a work alone in 11 days while B takes 16.5 days to do it alone. It takes 5.5 days for them to complete the work together with C. If C and D can work together in 22 days, then how many days will D need to complete the work alone?

(a) 44
(b) 66
(c) 55
(d) 77

Q60. Where was the world's first thermal battery making facility inaugurated?

(a) New Delhi
(b) Andhra Pradesh
(c) Tamil Nadu
(d) Kerala

Q61. To represent the speed of 72 kmh^(-1) in ms^(-1), we will write _____.

(a) 20
(b) 72000
(c) 2.0
(d) 200

Q62. The right to privacy is mentioned under which part of the Indian Constitution?

(a) Part IV
(b) Part I
(c) Part III
(d) Part II

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Q63. If electric charge (Q) and time (t) are given, what will be the formula for finding electric current (I)?

(a) t / Q
(b) Q × t
(c) Q / t
(d) Q - t

Q64. What will be the difference of 25/12 and 1/58 ?

(a) 7/13
(b) 1/0 4
(c) 5/24
(d) 10/24

Q65. The mean of the 5 smallest numbers in a group is 19, while collectively the average of all 13 numbers in the group is 21 then what is the mean of the largest 8 numbers of the group?

(a) 23.50
(b) 23.75
(c) 22.25
(d) 22.75

Q66. Construction of _____ was started in AD 1632 and was completed in late 1648 AD

(a) Taj Mahal
(b) Red Fort
(c) Qutub Minar
(d) Moti Mahal

Q67. Akila is sweeping a square hall, whose entrance is in the east direction. After entering the room, Akila starts cleaning her right side. On each sweep she makes an angle of 90° with the broom. Which direction is the broom now?

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

Q68. Prime Minister Narendra Modi was the Chief Minister of which state during the tenure from 2001 to 2014?

(a) Bihar
(b) Rajasthan
(c) Gujrat
(d) Uttar Pradesh

Q69. The tank has two taps. Tap A is to fill the tank and tap B is to empty the tank. If only tap A can fill the tank in 35 hours, only tap B can empty the filled tank completely in 70 hours. Find how many hours it will take to fill the half empty tank completely.

(a) 40 hours
(b) 70 hours
(c) 35 hours
(d) 55 hours

Q70. _____ implemented the doctrine of lapse or usurpation policy.

(a) Lord Hastings
(b) Lord Wellsley
(c) Lord Cornwallis
(d) Lord Dalhousie

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Q71. An amount of Rs 200 was invested in a one-year plan, in which 10% annual simple interest was offered, compounded annually in interest. Another amount of Rs 200 was iinvested in a one-year plan at 10% per annum, but interest was compounded half-yearly. How much more will be the interest earned under the second plan?

(a) 10 paisa
(b) 25 paisa
(c) 1 paisa
(d) 50 paisa

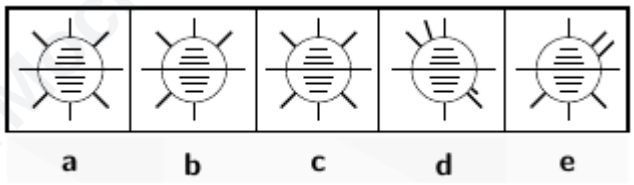
Q72. Who is the author of the novel Swami and Friends?

(a) A K Ramanujan
(b) R K Lakshman
(c) R K Narayan
(d) Anita Nair

Q73. What will be the color of litmus solution when mixed with sulfuric acid?

(a) Orange
(b) Blue
(c) Red
(d) Pink

Q74. Select a figure which is different from other figures.



(a) b
(b) e
(c) a
(d) d

Q75. The number of regular polygons that can be recursively form by sharing arms to each other is _____.

(a) 3
(b) 4
(c) 6
(d) 2

Q76. Select the option that is related to the third term in the same way as the second term is related to the first term.

Book : Chapter :: Car : ?

(a) Sharing
(b) Steering
(c) Cockpit
(d) Pedal

Q77. Read the statement and identify the logical conclusion based on the given information.

Statement:

A teacher told a parent, "This child needs to be counseled for his bad behavior."

Conclusion:

I. Counseling is one of the ways to correct behavioral problems.

II. Counseling is the only way to correct the behavior.

(a) Only conclusion II is correct
(b) Both I and II are true
(c) Only conclusion I follows

(d) Neither conclusion I nor II is correct

Q78. The resistance of the wire is in the inverse ratio of _____.

(a) Temperature
(b) Resistivity
(c) Length
(d) Cross-section area

Q79. A sound source sends waves of frequency 400 Hz and 2.5 m wavelength. What will be the speed of sound waves?

(a) 1000 m / s
(b) 10000 m / s
(c) 100 m / s
(d) 10 m / s

Q80. An object was thrown upwards at a speed of 14 ms-1 and flew 10 m high. Calculate the time taken by the object to reach the highest point.

(a) 1.63 s
(b) 1.43 s
(c) 1.53 s
(d) 1.33 s

Q81. You are given a question and two equations. Find which equation (s) is / are sufficient to answer the question.
Find the value of z, if
1) A = [*20c 1 2; 3 1], B = [1 0; 0 z]
2) AB = A

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

Q82. The difference between 3/8 and an other number is 1/5. What is another number?

(a) 8/15
(b) 2/3
(c) 3/40
(d) 7/40

Q83. Which country hosted the 2018 Commonwealth Games?

(a) South Africa
(b) Australia
(c) China
(d) India

Q84. Who is the Chief Minister of Assam since August 2018?

(a) Arvind kejriwal
(b) Biplab Deb
(c) Nitish Kumar
(d) Sarbananda Sonowal

Q85. The following table shows the passing percentage of the results of the four schools in the last four years.

School Name	2012-13	2013-14	2014-15	2015-16
XYZ	78	69	81	92
ABC	61	72	84	96
PQR	81	92	85	97

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TUV	92	69	72	95

Which school's performance is increasing every year?

(a) TUV
(b) XYZ
(c) PQR
(d) ABC

Q86. The ratio of sand and cement in a mixture is 7: 1. How much cement should be added to the remaining 72 kg of this mixture so that the resulting mixture has a ratio of 6: 1?

(a) 3 kg
(b) 1.5 kg
(c) 1 kg
(d) 2 kg

Q87. Where does the process of fertilization take place in the human body?

(a) Uterus
(b) Fallopian tube
(c) Ovary
(d) Vagina

Q88. Which state of India is the leading producer of cotton?

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

Q89. Select the most suitable option to solve the given equation.

5/13 + 1/3 5

(a) 18/65
(b) 65/18
(c) 18/18
(d) 264/65

Q90. Shahzar Rizby won gold in the men's 10m air pistol competition at the 2018 ISSF World Cup held in Mexico. He is from which Indian state?

(a) Punjab
(b) Bihar
(c) Uttar Pradesh
(d) Arunachal Pradesh

Q91. Read the given statement and conclusions carefully and choose which of the conclusions logically follows the given statement.

Statement:

We should develop our traditional weaving methods by promoting handicrafts.

Conclusions:

I. There are various traditional weaving methods.

II. Handicraft products are not affordable for the general public.

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

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Q92. A quadratic equation has two origins x = 1/11 and x = (-1)/9. How can the equation be written in the following way?

(a) (11x - 1)(9x - 1) = 0
(b) (11x - 1)(9x + 1) = 0
(c) (11x + 1)(9x - 1) = 0
(d) (11x + 1)(9x + 1) = 0

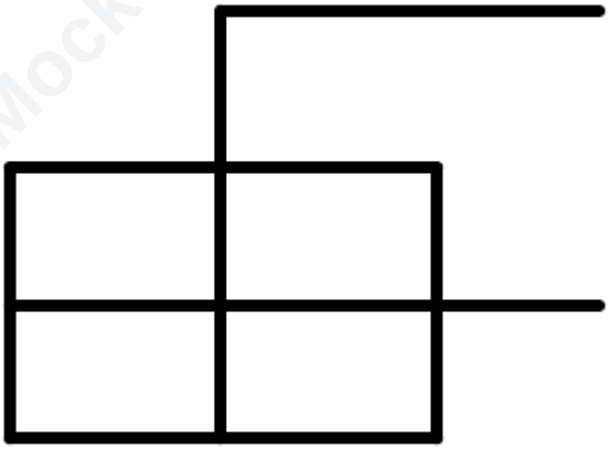
Q93. Who is the director of the film "Padmavat" released in 2018?

(a) Sanjay Leela Bhansali
(b) K. Vishwanath
(c) Rajkumar Hirani
(d) S. S. Rajamouli

Q94. The Irish diplomat and former director-general of the General Agreement on Tariffs and Trade (now, WTO) is which of the following personality?

(a) Ken Rutherford
(b) Peter Sutherland
(c) Peter Gilmore
(d) Kiefer Sutherland

Q95. Count the number of squares in the following figure.



(a) 6
(b) 7
(c) 8
(d) 25

Q96. Three of the four options below are related in a particular way. Choose an option that is different or mismatched from the others.

(a) Tweet
(b) Chat
(c) Scream
(d) Snake

Q97. Which of the following languages is spoken by most of the locals and is also known as Castellano?

(a) Italian
(b) Spanish
(c) Portuguese
(d) Greek

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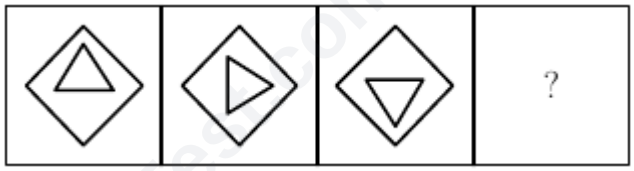
Q98. A cyclist covers the first three kilometers at an average speed of 8 km/h, the other two kilometers at 3 km/h and the last two kilometers at 2 km/h. What is the approximate average speed (in km/h) of the entire journey?

(a) 3
(b) 2.4
(c) 3.43
(d) 3.8

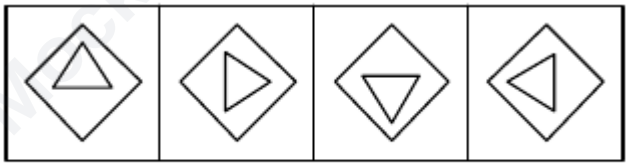
Q99. Force / Acceleration =

(a) Momentum
(b) Speed
(c) Mass
(d) Pressure

Q100. Which answer figure will replace the question mark?



Answer figures:



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

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (b) 15 days

Shortcut Trick

Total Work (LCM of 12, 21) = 84 units.

Brazen efficiency = 84 ÷ 12 = 7 units/day; Ballary efficiency = 84 ÷ 21 = 4 units/day.
In 2 days (1 cycle), work done = 7 + 4 = 11 units.
In 14 days (7 cycles), work done = 11 × 7 = 77 units. Remaining = 84 − 77 = 7 units.
On 15^(th) day, Brazen completes the remaining 7 units (7 ÷ 7 = 1 day).
Therefore The correct answer is 15 days.
Alternate Method
Given: Time taken by Brazen = 12 days, Time taken by Ballary = 21 days.
Formula: Total Work = LCM of individual days; Efficiency = Total Work ÷ Time.

Person	Days	Total Work	Efficiency
Brazen	12	84	7
Ballary	21	4	

=> Work done in the 1^(st) 2nd-day cycle (Brazen + Ballary) = 7 + 4 = 11 units.
=> Number of complete cycles to reach near 84 = 84 ÷ 11 ≈ 7 cycles.
=> Work done in 14 days (7 cycles × 2) = 11 × 7 = 77 units.
=> Remaining work = 84 − 77 = 7 units.
=> 15^(th) day is Brazen's turn. Brazen completes 7 units in (7 ÷ 7) = 1 day.
=> Total time = 14 + 1 = 15 days.
Therefore The correct answer is 15 days.
Additional Information
Alternate Day Work
In alternate work, tasks are calculated in cycles. If A and B work alternately, 1 cycle = 2 days, and work per cycle = Efficiency of A + Efficiency of B.
Fractional Days
If remaining work is less than a person's daily efficiency, the time taken is calculated as (Remaining Work ÷ Efficiency).

Q2. Answer: (d) 17

Shortcut Trick
This is an alternating mixed series containing three interleaved sequences.
Sequence 1: 1^(st), 4^(th), 7^(th) terms → 11, 23, (23−4) is not matching. Check alternating pairs.
Sequence 1 (1^(st), 3^(rd), 5^(th)...): 11, 13, 17, 19, 23 (Prime numbers starting from 11).
Sequence 2 (2^(nd), 4^(th), 6^(th)...): 12, 23, 34, 45 (Arithmetic progression with common difference +11).
Therefore The correct answer is 17.
Alternate Method
Given Series: 11, 12, 13, 23, _____, 34, 19, 45, 23
The series is formed by combining two different patterns at alternate positions.
11
skip
→
13
skip
→
17
skip
→
19
skip
→
23
Pattern Explanation:
=> Odd-positioned terms (1^(st), 3^(rd), 5^(th), 7^(th), 9^(th)): These are consecutive prime numbers starting from 11.
=> 11, 13, 17, 19, 23.

=> Even-positioned terms (2^(nd), 4^(th), 6^(th), 8^(th)): These follow a +11 addition pattern.

=> 12 + 11 = 23

=> 23 + 11 = 34

=> 34 + 11 = 45

Therefore The correct answer is 17.

Additional Information

Mixed/Combined Series

A series where two or more different sequences are interleaved. Always check alternate terms if the sequence fluctuates up and down.

Prime Number Series

Numbers that have only two factors: 1 and themselves. Common prime series segments include 2, 3, 5, 7, 11, 13, 17, 19, 23, 29...

Arithmetic Progression (AP)

A sequence where the difference between consecutive terms remains constant (e.g., +11 in the even terms of this question).

Q3. Answer: (d) 31239

Shortcut Trick

A number is divisible by 9 if the sum of its digits is divisible by 9.

Checking option (4): 3 + 1 + 2 + 3 + 9 = 18.

Since 18 is divisible by 9 (18 ÷ 9 = 2), the number 31239 is divisible by 9.

Therefore The correct answer is 31239.

Alternate Method

Given: Numbers 29039, 19239, 17139, 31239.

Formula Used: Divisibility Rule of 9 → Sum of digits must be a multiple of 9.

Calculations:

=> For 29039: 2 + 9 + 0 + 3 + 9 = 23 (Not divisible by 9)

=> For 19239: 1 + 9 + 2 + 3 + 9 = 24 (Not divisible by 9)

=> For 17139: 1 + 7 + 1 + 3 + 9 = 21 (Not divisible by 9)

=> For 31239: 3 + 1 + 2 + 3 + 9 = 18 (Divisible by 9: 9 × 2 = 18)

Therefore The correct answer is 31239.

Additional Information

Divisibility Rule of 3

A number is divisible by 3 if the sum of its digits is divisible by 3.

Divisibility Rule of 11

Difference between the sum of digits at odd places and even places must be 0 or a multiple of 11.

Divisibility Rule of 6

A number is divisible by 6 if it is divisible by both 2 and 3.

Q4. Answer: (a) 3993

Shortcut Trick

Periodic rate for 4 months = 30% ÷ 3 = 10%.

Total periods in 1 year = 12 ÷ 4 = 3 periods.

Using the ratio method for 10% (1/10): Principal : Amount = 10 : 11.

For 3 periods: $(10)^3 : (11)^3$ => 1000 : 1331.

Since 1000 units = Rs. 3000, then 1331 units = 1331 × 3 = Rs. 3993.

Therefore The correct answer is Rs. 3993.

Alternate Method

Given: Principal (P) = Rs. 3000, Annual Rate (R) = 30%, Time (T) = 1 year, Compounding = Every 4 months.

Formula: Amount (A) = $P(1 + r/100)^n$

=> Number of conversion periods (n) = 12 ÷ 4 = 3

=> Rate per period (r) = 30% ÷ 3 = 10%

=> $A = 3000 \times (1 + 10/100)^3$

=> $A = 3000 \times (1.1)^3$

=> A = 3000 × 1.331

=> A = 3993

Therefore The correct answer is Rs. 3993.

Additional Information

Effective Rate of Interest

When interest is compounded more than once a year, the Effective Annual Rate (EAR) is higher than the nominal rate. Formula: $EAR = [1 + (R/n)]^n - 1$.

Compounding Frequencies

For Half-yearly, n=2 and r=R/2. For Quarterly, n=4 and r=R/4. For Monthly, n=12 and r=R/12.

Compound Interest vs Simple Interest

For the first period, SI and CI are equal. From the second period onwards, CI > SI because interest is calculated on the accumulated amount.

Q5. Answer: (a) Sunday

The logic followed here is:

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

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

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

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

Code for weekdays:

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

Total odd days = 1 + 1 + 1 + 4 = 7 days = 0 odd day.

'0' is the code for "Sunday".

Hence, the correct answer is "Sunday".

Key Points

• Take the last two digits of the year.
• Divide by 4, discarding any remainder.
• Add the day of the month.
• Add the month's key value: JFM AMJ JAS OND 144 025 036 146
• Subtract 1 for January or February of a leap year.
• For a Gregorian date, add 0 for 1900's, 6 for 2000's, 4 for 1700's, 2 for 1800's; for other years, add or subtract multiples of 400.
• For a Julian date, add 1 for 1700's, and 1 for every additional century you go back.
• Add the last two digits of the year.

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• Divide by 7 and take the remainder.

Q6. Answer: (c) 14

The correct answer is 14.

Key Points

• Child Labour (Prohibition and Regulation) Act was enacted by the Ministry of Law and Justice on 30th July 2016.

• This Act amended the Child Labour (Prohibition and Regulation) Act, 1986.

• According to this Act:

• No child shall be employed or permitted to work in any occupation or process.

• Criteria of a child - A person below the age of 14 yrs.

Additional Information

• Nothing in Act shall apply where the child:

• Helps his family or family enterprise, which is other than any hazardous occupations or processes set forth in the Schedule, after his school hours or during vacations.

• Works as an artist in the audio-visual entertainment industry, including advertisement, films, television serials or any such other entertainment or sports activities except the circus.

Important Points

• Article 24 - Prohibition of child labour.

Q7. Answer: (c) cos θ

Shortcut Trick

According to the Complementary Angle rule in trigonometry:

For any angle θ, sin (90° − θ) always transforms into its co-function cos θ.

The sign remains positive because (90° − θ) lies in the First Quadrant where all ratios are positive.

Therefore The correct answer is cos θ.

Alternate Method

Given: A right-angled triangle ABC where angle A = 90°, angle B = θ, and angle C = 90° − θ.

Formula Used:

sin α = Perpendicular ÷ Hypotenuse

cos α = Base ÷ Hypotenuse

Calculations:

=> For angle B = θ: Perpendicular = AC, Base = AB, Hypotenuse = BC

=> cos θ = AB ÷ BC

=> For angle C = 90° − θ: Perpendicular = AB, Base = AC, Hypotenuse = BC

=> sin (90° − θ) = AB ÷ BC

=> Comparing both equations: sin (90° − θ) = cos θ

Therefore The correct answer is cos θ.

Additional Information

ASTC Rule (All Silver Tea Cups)

In the First Quadrant (0° to 90°), all trigonometric ratios (sin, cos, tan, cot, sec, cosec) are positive.

Co-function Identities

At 90° and 270°, trigonometric functions change to their co-functions: sin ↔ cos, tan ↔ cot, and sec ↔ cosec.

Other 90° − θ Relations

tan (90° − θ) = cot θ and sec (90° − θ) = cosec θ.

Q8. Answer: (a) 576

Concept used:

A given natural number can be expressed as 2a.3b.5c.7d..... and so on

Where a, b, c, d ..... and so on are whole numbers

Total number of factors = (a + 1) × (b + 1) × (c + 1) × (d + 1) ..... and so on

Total number of even factors = a × (b + 1) × (c + 1) × (d + 1) ..... and so on

Calculation:

Total number of even factors = 8 × (2 + 1) × (3 + 1) × (5 + 1)

Therefore Total numbers of even factors is 576

Q9. Answer: (c) 44%

The correct answer is 44%.

Key Points

• Momentum can be defined as the product of the mass of a particle and its velocity.

• It is denoted by p, SI unit is (Kg-m)/s and Dimension is MLT^(−1).

• Newton's second law defines a force to be equal to the change in momentum with a change in time.

Additional Information

If Initial Momentum = p_(i,)Mass of object = m, and velocity of object = v

Kinetic Energy, K.E_i= 1/2 (mv^2)

1/2 (mv2) = (1/2 $(mv)^2$)/m = (1/2p^2)/m

Now, p increases by 20%, so new momentum,

p_f =(p + 20% of p) = p + p/5 = 6p/5.

New Kinetic Energy = (1/2p_f2)/m.

So, K.E_f= (1/2 * (6p/5)^2)/m = 36/25 * (1/2p2)/m.

% increase in K.E = (Change in K.E/ Initial K.E) * 100

=((36/25 * (1/2p2)/m - (1/2p2)/m) / (1/2p2)/m) * 100.

So, % increase in K.E = (11/25) * 100 = 44%.

Mistake Points

K.E = 1/2 (mv2) = 1/2 (mv)*v.

K.E = 1/2(pv), ---------- 1

But the above equation is wrong to implement in this question.

• Since p = m*v, where mass is always constant, and velocity varies, which means momentum varies because of the velocity.

• In eqn. 1, v is left out, and hence the result thus produced will be wrong.

Q10. Answer: (b) North-West

According to given conditions,

If North-West is called North

then,

West is called North-West.

Hence, ‘North-West’ is the correct answer.

Q11. Answer: (d) L

According to given conditions,

So 15th form the left side is L

Hence, 'L' is the correct answer.

Q12. Answer: (a) 27

The number of triangles in the figure is shown below:

Hence, ‘27’ is the correct answer.

Shortcut Trick

The pattern follows here is:

Figure 1:

Number of triangles = 8 + 1 + 3 + 3 + 1 = 16

Figure 2:

Number of triangles = 3 + 3 + 3 = 9

Figure 3:

Number of triangles = 1 + 1 = 2

Thus total number of triangles = 16 + 9 + 2 = 27

Hence, the correct answer is "27".

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Q13. Answer: (c) Tea

The correct answer is Tea.

Key Points

• Tea is a herb, that is grown in vegetable gardens or fields.

• Horticulture is the study of growing flowers, fruits, and vegetables.

• Major Indian horticultural products:

• Apple, Guava, Grapes, Banana, Litchi, etc.

• India is the second-largest producer of fruits and vegetables in the world.

Q14. Answer: (b) Only I is implicit

(I) People are getting fake calls for stealing bank account details

It is implicit as the statement given by the Managing Director of the Bank is to inform its customers about such fake calls taking place for stealing bank account details are taking place.

(II) Bank officials call customers to change ATM PIN

It is not implicit to the statement.

Hence, only I is implicit.

Q15. Answer: (c) Anthers and Filaments

The correct answer is Anthers and Filaments.

Key Points

• The male reproductive organ of the flower is known as the stamen.

• It is having two parts:

• Anthers - The part of the stamen where pollen is produced.

• Filaments - It is a stalk-like structure that connects the base of the flower with anther.

Additional Information

• Ovary - It is the enlarged basal portion of the pistil, where ovules are produced.

• Pistil - It is the female reproductive part of the flower.

• Stigma - It is the part of the pistil where pollen germinates.

Q16. Answer: (d) 140 m

Shortcut Trick

Convert speed: 66 km/hr = 66 × (5/18) = 55/3 m/s.

Total distance (Train + Bridge) = Speed × Time = (55/3) × 33 = 605 m.

Train length = Total distance − Bridge length = 605 − 465 = 140 m.

Therefore The correct answer is 140 m.

Alternate Method

Given:

Speed of train = 66 km/hr

Length of bridge = 465 m

Time taken to cross = 33 seconds

Formula Used:

Distance = Speed × Time

Speed in m/s = Speed in km/hr × (5/18)

Calculations:

=> Speed = 66 × (5/18) m/s

=> Speed = 11 × (5/3) = 55/3 m/s

=> Let the length of the train be 'L' meters.

=> Total distance = L + 465

=> L + 465 = (55/3) × 33

=> L + 465 = 55 × 11

=> L + 465 = 605

=> L = 605 − 465

=> L = 140 m

Therefore The correct answer is 140 m.

Additional Information

Unit Conversion

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

Train Crossing Stationary Object with Length

When a train crosses a bridge, tunnel, or platform, the total distance covered is (Length of train + Length of object).

Train Crossing Point Object

When a train crosses a pole, tree, or standing man, the distance covered is equal to the length of the train only.

Q17. Answer: (a) Roasting

The correct answer is Roasting.

Key Points

• Roasting is a process of metallurgy where ore is converted into its oxide.

• It involves the heating of ores below their melting point in the presence of excess air.

• During the process of roasting moisture and non-metallic impurities in the form of volatile gases are removed.

Additional Information

• Calcination - The process of heating and converting ore into an oxide. The moisture is also removed from the ore in this process.

• Corrosion - The natural process that converts refined metals into more stable compounds such as metal oxides, metal sulfides, or metal hydroxides.

• Extraction - It is the process of taking out metals from their ores through mining.

Q18. Answer: (a) –, ÷, +

Calculation:

[(100 ? 2) ? 2] ? 10 = 59

Checking options

Option 1

[(100 – 2) ÷ 2] + 10 = (98/2) + 10 = 59

Option 2

[(100 – 2) × 2] ÷ 10 = 19.6

Option 3

[(100 + 2) × 2] × 10 = 2040

Option 4

[(100 + 2) ÷ 2] ÷ 10 = 5.1

Therefore Option 1 is correct

Q19. Answer: (a) Butene : CH3 - CH2 - CH = CH2

The correct answer is Butene: CH3 - CH2 - CH = CH2

Key Points

• Butene Molecular Formula is C4H8 or CH3CH2CH=CH2 & Molecular Weight is 56.11 g/mol.

• Butene is a colourless gas.

• It is used for the production of a wide variety of chemicals in the gasoline and rubber processing areas.

Important Points

• Propane is an alkene that is propane with a double bond at position 1. It is a gas molecular entity.

• Propene molecular formula C3H6 or CH2CHCH3 or CH3CHCH2 & molecular weight 42.08 g/mol.

• Ethane appears as a colourless odourless gas. It is easily ignited. The vapours are heavier than air. It can asphyxiate by the displacement of air.

• Molecular formula C2H6 or CH3CH3 & molecular weight is 30.07 g/mol.

Q20. Answer: (d) Alessia Cara

The correct answer is Alessia Cara.

Key Points

• Alessia Cara wins Best New Artist at the 60th Annual GRAMMY Awards.

Important Points

• Ed Sheeran wins for Best Pop Solo Performance for "Shape Of You" at the 60th Annual GRAMMY Awards.

• Kendrick Lamar wins Best Rap Album for DAMN at the 60th Annual GRAMMY Awards.

Additional Information

• Dave Chappelle wins Best Comedy Album for The Age of Spin and Deep in the Heart of Texas at the 60th Annual GRAMMY Awards.

• Chris Stapleton wins Best Country Album for From A Room Volume 1 at the 60th Annual GRAMMY Awards.

• Bruno Mars wins Song Of The Year for "That's What I Like" at the 60th Annual GRAMMY Awards.

• Bruno Mars wins Album of the Year for 24K Magic at the 60th Annual GRAMMY Awards.

Q21. Answer: (a) Iron nail

The correct answer is Iron nail.

Key Points

• The Density of the iron nail is greater than the density of water.

• The density of water is not really 1 g/ml, but rather a bit less at 0.9998395 g/ml at 4.0° Celsius (39.2° Fahrenheit).

Important Points

• As water is warmed from the freezing point of 0 to 4 °C. It contracts and becomes denser. This initial increase in density takes place because at 0°C a portion of the water consists of open-structured molecular arrangements similar to those of ice crystals.

• Ice is less dense than water.

• The cork's density is 0.24 g/cm^3, and the density of water is 1.00 g/cm^3. So the cork will float.

Q22. Answer: (d) 189

Shortcut Trick

Number: 35721. Last digit is 1, so the square root ends in 1 or 9.

Split the number: 357 | 21. The nearest square less than 357 is 324 (square of 18).

Possible answers: 181 or 189.

Check 1852: 18 × 19 = 342 → 1852 = 34225. Since 35721 > 34225, the answer is 189.

Therefore The correct answer is 189.

Alternate Method

Given: Number = 35721

Method: Long Division Method

=> Grouping the digits from right: 3, 57, 21.

=> 12 = 1; Remainder = 2. Bring down 57 → 257.

=> Double the quotient (1 × 2 = 2). 28 × 8 = 224; Remainder = 33. Bring down 21 → 3321.

=> Double the quotient (18 × 2 = 36). 369 × 9 = 3321; Remainder = 0.

Therefore The correct answer is 189.

Additional Information

Unit Digit Property

If a perfect square ends in 1, its square root must end in either 1 or 9.

Estimation Method

Find the range: 1802 = 32400 and 1902 = 36100. Since 35721 lies between these, the root is between 180 and 190.

Perfect Square Ending with 5

The square of a number ending in 5 is calculated as: [n(n+1)] followed by 25. Example: 1852 = (18 × 19)25 = 34225.

Q23. Answer: (d) [figure]

The shaded part is replaced by,

Hence, the figure in option 4 is the correct answer.

Q24. Answer: (a) 9:00 AM

The time at which the mirror image of the clock shows the time of 3:00 AM can find out by subtracting 3 : 00 AM from 11 : 60.

So, 11 : 60 – 3 : 00 = 8 : 60

= 9 : 00 AM

At 9:00 AM the mirror image of the clock show the time of 3:00 AM.

Hence, '9 : 00 AM' is the correct answer

Q25. Answer: (d) Lanthanoid

The correct answer is Lanthanoid.

Key Points

• The lanthanide series includes elements 58 to 71, which fill their 4f sublevel progressively.

• Lanthanides have a different chemistry from transition metals because their 4f orbitals are shielded from the atom's environment.

• Lanthanide contraction progressive decrease in the radii of atoms of the lanthanide elements as the atomic number increases, evident in various physical properties of the elements and their compounds.

Important Points

• Actinides are elements 89 to 103 and fill their 5f sublevel progressively, Actinides are typical metals and have properties of both the d-block and the f-block elements, but they are also radioactive.

• Actinide any of the 14 radioactive elements of the periodic table that are positioned under the lanthanides.

• Halogen, any of the six nonmetallic elements that constitute Group 17 (Group VIIa) of the periodic table. The halogen elements are fluorine (F), chlorine (Cl), bromine (Br), iodine (I), astatine (At), and tennessine (Ts).

• Transition metal, any of various chemical elements that have valence electrons i.e., electrons that can participate in the formation of chemical bonds in two shells instead of only one.

Q26. Answer: (b) Only I follows

The least possible venn diagram is:

I. Some tigers are lions. → True (It is definitely because all leopards are lions and Some tigers are leopards.)

II. No lion is tiger → False (It is not definite)

Hence, only I follows.

Q27. Answer: (c) Parenchyma

The correct answer is Parenchyma.

Key Points

• Parenchyma:

• These are living polygonal cells with a big central vacuole & intercellular spaces amidst them.

• Parenchymatous cells are responsible to create ground pith & tissue.

• It comprising of chloroplasts and that's why it is termed chlorenchyma & it helps in photosynthesis.

• Parenchyma which comprises the big air voids is called aerenchyma. 'Buoyancy' is the main purpose of aerenchyma.

• Some of these cells perform as storage chambers for starch in fruits & vegetables.

Important Points

• Epithelial tissues are widespread throughout the body. They form the covering of all body surfaces, line body cavities, & hollow organs, and are the major tissue in glands. They perform a variety of functions that include protection, secretion, absorption, excretion, filtration, diffusion, and sensory reception.

• Muscle tissue is composed of cells that have the special ability to shorten or contract in order to produce movement of the body parts. The tissue is highly cellular and is well supplied with blood vessels.

• Connective tissue, group of tissues in the body that maintains the form of the body and its organs and provides cohesion and internal support.

Q28. Answer: (c) Only II and III follow

The least possible Venn diagram is:

I. Some W is not D. → False (It can be possible but it is not definite)

II. Some V are S. → True (It is definite)

III. Some D are S. → True (It is definite)

Hence, only II and III follow.

Q29. Answer: (b) SV22

The pattern followed here is:

According to the alphabetical positions of the letters,

Hence, 'SV22' is the correct answer.

Q30. Answer: (a) Divorce

The correct answer is Divorce.

Key Points

• This Act, in substance, declared the triple talaq, ie talaq-e-biddat or any other similar form of talaq, illegal.

• Any Muslim husband who pronounces such talaq to his wife can suffer imprisonment for a term of three years and also be liable for a fine.

• This Act may be called the Muslim Women (Protection of Rights on Marriage) Act, 2019.

Important Points

• Dowry Prohibition Act, Indian law, enacted on May 1, 1961, intended to prevent the giving or receiving of a dowry.

• The Child Marriage Restraint Act,1929 being a male above eighteen years of age and below twenty-one, contracts a child marriage shall be punishable with simple imprisonment.

Q31. Answer: (a) Lateral meristem

Key Points

• Meristems or meristematic tissue is the type of plant tissue that has the capability of cell division.

• It is composed of undifferentiated cells.

• They help in increasing the length and thickness of a plant.

• According to their position and function they are divided into 3 types:

• Apical meristem - They are present at the tips of roots and stems. They help in increasing the length of the plant.

• Lateral meristem - They help in increasing the thickness and girth of a plant. They are also called secondary meristems because they occur in the mature regions of roots and shoots.

• Intercalary meristem - They are found at the base of leaves and internodes. They help in the elongation of internodes.

• Lateral meristems also helps in forming the secondary tissues like cambium.

Q32. Answer: (c) South Korea

The correct answer is South Korea.

Key Points

• A ski is a narrow strip of semi-rigid material worn underfoot to glide over snow.

• A humanoid robot is a robot with its body shape built to resemble the human body.

• The robots are equipped with sensors, batteries, artificial intelligence, and deep learning algorithms that allowed them to move on their own.

Additional Information

• Uses of robots:

• Research in the Scientific field.

• Personal Assistance

• Entertainers

• Space Exploration

• Sophia, first humanoid robot to get citizenship of a country. Sophia is a Saudi Arabian citizen.

Q33. Answer: (a) 1 : 3

The correct answer is 1 : 3.

Key Points

Explanation:

• The relation between Linear momentum and KE is:

• P= √2mKE

• Here

• m= Mass of the body

• KE = kinetic Energy

• Given Data:

• m1= mass of first body i.e= m (Given)

• m2= mass of second body i.e= 9m (Given)

• Let us assume:

• KE1 = kinetic Energy of the first body
• KE1 = kinetic Energy of the second body
• The ratio of linear momentum:
• P1/ P2 = √2m1KE1/ √2m2KE1
• P1/ P2 = √m1/ √m2
• P1/P2 = 1/3
Hence, The ratio of their linear momentum is 1:3.

Q34. Answer: (c) A

The mirror image of the following figure is shown below:
Hence, ‘option 3’ is the correct answer.

Q35. Answer: (b) UPZPUB

According to the alphabetical positions of the letters,
The pattern followed here is:
Similarly,
Hence, ‘UPZPUB’ is the correct answer.

Q36. Answer: (b) 34225

Shortcut Trick
Check the unit digit of a perfect square: It can only be 0, 1, 4, 5, 6, or 9.
A perfect square cannot end in 2, 3, 7, or 8.
Option (1) ends in 2, Option (3) ends in 8, and Option (4) ends in 3 → None are perfect squares.
Only 34225 ends in 5, which is a potential perfect square.
Therefore The correct answer is 34225.
Alternate Method
Given numbers: 46232, 34225, 14448, 46233
=> For a number to have a rational square root, it must be a perfect square.
=> Checking unit digits: 46232 (2), 14448 (8), 46233 (3) are disqualified.
=> Testing 34225: √34225 = 185.
=> 185 is a rational number because it can be written as 185/1.
Therefore The correct answer is 34225.
Additional Information
Rational Square Root
The square root of a number is rational if and only if the number is a perfect square of a rational number.
Digital Sum Property
The digital sum (sum of digits until a single digit is reached) of every perfect square is always 1, 4, 7, or 9.
Ending in 5
A perfect square ending in 5 must always end in 25. If the last two digits are not 25, it is not a perfect square.

Q37. Answer: (d) North-East

According to given conditions,
Hence, ‘North-East’ is the correct answer.

Q38. Answer: (c) t^(3/2)

The correct answer is t3/2
• Suppose a body is moved along a straight line by a machine delivering a constant power P, and the distance moved by the body is S.
• Power, P=F.v
• Force, F=ma
• where,
• velocity, v= Sover t
• acceleration, a= s/t^2
• m= mass

• Calculation:
• P= mav
• P=m*s/t²*s/t
• S²= Pt³/m
• hence from the above equation
• S2 prop. to t3
• s prop. to t^(3/2)
• Hence option 3 is correct.

Q39. Answer: (b) [figure]

All options except '2' are plane 2-D figures, while option 2 is a 3-D figure.

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

Q40. Answer: (a) Electronegativity

The correct answer is Electronegativity.

Important Points

• The concept of electronegativity was first proposed by Linus Pauling in 1932.
• Linus Pauling explained that the covalent bond between two different atoms (A–B) is stronger than the average of the A–A and the B–B bonds.

Key Points

• The electronegativity of an atom is affected by both its atomic number and the distance that its valence electrons reside from the charged nuclei.
• Fluorine is the most electronegative element.
• Cesium is the least electronegative element.

Additional Information

Ionization Energy	**Ionization energy is the minimum amount of energy required to remove the most loosely bound electron of an isolated neutral gaseous atom or molecule.**
Quantum Energy	According to quantum theory, energy is held to be emitted and absorbed in tiny, discrete amounts.

Q41. Answer: (b) 44 u

The correct answer is 44u.

The atomic number of Carbon is 6 and its atomic mass is 12.0107u.

The atomic number of Oxygen is 8 and its atomic mass is 15.999u.

So, CO2contains 1 carbon molecule and 2 oxygen molecules.

Taking atomic masses as whole

Then, 1 x 12 + 2 x 16 = 44

Hence, the relative molecular mass of CO2is 44u.

Key Points

• The molecular mass is the mass of a given molecule.
• It is measured in daltons (Da or u).

Q42. Answer: (a) Medulla

The correct answer is Medulla.

Key Points

• The medulla is the lowest part of the brain and the lowest portion of the brainstem.
• The medulla is connected by the pons to the midbrain and is continuous posteriorly with the spinal cord.
• The medulla plays a critical role in transmitting signals between the spinal cord and the higher parts of the brain and in controlling autonomic activities, such as heartbeat and respiration.

Additional Information

Parts of Brain	**Functions**

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Cerebrum	Sensory processing, Language, and communication, Learning and memory
Cerebellum	Posture, balance, coordination, and speech, resulting in smooth and balanced muscular activity.
Brain Stem	Cardiac and respiratory functions.

Q43. Answer: (d) 84 years

Shortcut Trick

Combine ratios X : Y (3 : 8) and Y : Z (4 : 5 → 8 : 10) to get X : Y : Z = 3 : 8 : 10.

Let ages be 3k, 8k, 10k. Using 2 years ago ratio: (3k − 2)/(8k − 2) = 1/3.

=> 9k − 6 = 8k − 2 => k = 4.

Sum of present ages = (3 + 8 + 10) × 4 = 21 × 4 = 84 years.

Therefore The correct answer is 84 years.

Alternate Method

Given: Ratio X : Y = 3 : 8 and Y : Z = 4 : 5.

Formula: Ratio combining and linear equations for age problems.

=> Make Y common in ratios: X : Y = 3 : 8 and Y : Z = 4 × 2 : 5 × 2 = 8 : 10.

=> Present ages ratio X : Y : Z = 3 : 8 : 10.

=> 2 years ago, (3k − 2) / (8k − 2) = 1 / 3.

=> 3 × (3k − 2) = 1 × (8k − 2) => 9k − 6 = 8k − 2.

=> 9k − 8k = 6 − 2 => k = 4.

=> Sum of present ages = 3k + 8k + 10k = 21k.

=> Sum = 21 × 4 = 84 years.

Therefore The correct answer is 84 years.

Additional Information

Ratio Balancing

To combine a:b and b:c, multiply both parts of the ratios to make the common term 'b' equal in both sets.

Age Problems

If the present age is 'x', then age 'n' years ago is (x − n) and age 'n' years hence is (x + n).

Sum of Ratios

Total value = (Sum of ratio parts) × Constant factor 'k'. Here, 3 + 8 + 10 = 21 parts.

Q44. Answer: (c) 1

Shortcut Trick

Let the diagonal of the square be d.

Area of a square in terms of diagonal = $d^2/2$.

According to the question: $d^2/2 = d/2$.

Solving for d gives d = 1.

Therefore The correct answer is 1.

Alternate Method

Given: Numerical value of Area = 1/2 × Numerical value of Diagonal.

Formula Used: Area of square = a^2 and Diagonal (d) = $a\sqrt{2}$, where a is the side.

=> Let the side of the square be a.

=> Area = a^2

=> Diagonal (d) = $a\sqrt{2}$

=> According to the problem: $a^2 = (1/2) \times a\sqrt{2}$

=> $a = (\sqrt{2})/2$

=> Diagonal (d) = $a \times \sqrt{2} = [(\sqrt{2})/2] \times \sqrt{2}$

=> d = 2/2 = 1

Therefore The correct answer is 1.

Additional Information

Properties of a Square

A square has four equal sides and each angle is 90°. The diagonals are equal and bisect each other at 90°.

Perimeter of a Square

The total boundary length is given by Perimeter = 4 × side.

Relationship between Area and Diagonal

The Area can be directly calculated using the diagonal: Area = (Diagonal)² ÷ 2.

Q45. Answer: (a) Sodium Hydrogen Carbonate

The correct answer is Sodium Hydrogen Carbonate.

Important Points

• Sodium Hydrogen Carbonate is commonly known as Baking Soda.

• The chemical name of Sodium Hydrogen Carbonate is NaHCO3.

• It is also called Sodium Bicarbonate.

Key Points

• It is a salt composed of a sodium cation (Na+) and a bicarbonate anion (HCO3−).

• It is a crystalline solid and white in color.

• Uses of Sodium Hydrogen Carbonate.

• Cooking and Baking

• Fungicide and Pest control

• Neutralization of acids

• Used as an antacid for acid indigestion

Additional Information

Compound name	Chemical formula
Ammonium Carbonate	NH4HCO3
Sodium Carbonate	Na2CO3
Ammonium Chloride	NH4Cl2

Q46. Answer: (d) 40 cm

Shortcut Trick

In a rhombus, the relationship between side (a) and diagonals (d1, d2) is: $4a^2 = d1^2 + d2^2$.

Given d1 = 16 and d2 = 12.

$4a^2 = 16^2 + 12^2 = 256 + 144 = 400$.

$a^2 = 100$ => a = 10 cm.

Perimeter = 4a = 4 × 10 = 40 cm.

Therefore The correct answer is 40 cm.

Alternate Method

Given: Diagonal d1 = 16 cm, Diagonal d2 = 12 cm.

Formula Used: Diagonals of a rhombus bisect each other at 90°. Side (a) = $\sqrt{[(d1/2)^2 + (d2/2)^2]}$. Perimeter = 4 × side.

=> Half of diagonals are 16/2 = 8 cm and 12/2 = 6 cm.

=> In the right-angled triangle formed by the half-diagonals and the side:

=> $Side^2 = 8^2 + 6^2$

=> $Side^2 = 64 + 36 = 100$

=> Side = √100 = 10 cm

=> Perimeter of Rhombus = 4 × 10 = 40 cm

Therefore The correct answer is 40 cm.

Additional Information

Area of Rhombus

The area is calculated using the formula: Area = 1/2 × d1 × d2.

Properties of Rhombus

All sides are equal, opposite angles are equal, and diagonals bisect each other at right angles (90°).

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Pythagorean Triplet

The numbers (6, 8, 10) form a Pythagorean triplet, making calculations for the side of the rhombus faster.

Q47. Answer: (d) CaO

The correct answer is CaO.

Important Points

• Compound name- Calcium Oxide.

• It is also known as quick lime or burnt lime.

Key Points

• Calcium Oxide is one of the oldest chemicals known to humans.

• Properties of Calcium Oxide.

• It is an amorphous solid.

• It has a melting point of 2572°C.

• It is a very stable compound and withstands high temperatures.

• It is prepared from Calcium Carbonate.

• $CaCO3 \rightarrow CaO + CO2$

• Uses of Calcium Oxide.

• It is extensively used for medicinal purposes and insecticides.

• It is used in the manufacturing of cement, paper, and high-grade steel.

• It is used as a reagent in laboratories for dehydration, precipitation reaction, etc.

Additional Information

CaCO3	**Compound name- Calcium Carbonate Uses- Cement and Steel manufacturing, Healthcare, Plastic and rubber manufacturing.**
CaCl2	Compound name- Calcium Chloride Uses- Production of activated charcoal, the electrolyte in sports drinks, deicing.
Ca(OH)2	Compound name- Calcium Hydroxide (slaked lime) Uses- paper production, food processing, sewage treatment, construction.

Q48. Answer: (d) >>

In the given series, sign increased by one and after two-step sign gets opposite to the next term come in the series is '>>'.

Hence, '>>' is the correct answer.

Q49. Answer: (c) There is no attraction force between particles of matter.

The correct answer is There is no attraction force between particles of matter.

Important Points

• In a Solid, the attractive forces keep the particles together tightly enough so that the particles do not move past each other.

• In a Liquid, particles will flow or glide over one another, but stay toward the bottom of the container.

• In a Gas, particles are in continual straight-line motion.

Key Points

• Anything that takes space is called matter.

• Generally, we consider three states of matter.

• Solid

• Liquid

• Gas

Additional Information

Solid	**Liquid**	**Gas**
has definite shape and volume.	has a definite volume but no definite shape	has no definite volume or shape
The particles are arranged close together and move very little by vibrating in place.	They take on the shape of their container.	The particles take on the shape of their container

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When heated can turn into a liquid.	When heated can turn into gas. When cooled can turn into solid.	gas can be liquified.

Q50. Answer: (c) M – Magnification, hi – Height of reflection, ho - Height of object

The correct answer is M – Magnification, hi – Height of reflection, ho - Height of object.

Key Points

Magnification equation:

• M = H_i/H_o = - D_i/D_o

• where M is the magnification

• H_iis the height of the image

• H_o is the height of the object,

• D_i is the distance from the lens to the image and

• D_o is the distance of the object to the lens.

• The minus sign signifies the fact that the image will be inverted.

Q51. Answer: (b) Grandmother-Grandfather

According to given conditions,

H and G are Grandmother-Grandfather of V.

Hence, ‘Grandmother-Grandfather’ is the correct answer.

Q52. Answer: (a) Only assumption I is implicit

I. Internet facility is not available at Krishna's house.

It is suggested by the statement as because of no internet facility available in Krishna’s house the person cannot contact through e-mail.

II. Nowadays it has become difficult to contact people on e-mail.

It is not implicit in the statement.

Hence, only assumption I is implicit.

Q53. Answer: (a) 340

Shortcut Trick

In Simple Interest, the interest earned is the same for every equal time interval.

Interest for 5 years (10 − 5) = Rs. 574 − Rs. 457 = Rs. 117.

Since the first amount is for 5 years, we subtract this 5-year interest from the 5-year amount.

Sum (Principal) = Rs. 457 − Rs. 117 = Rs. 340.

Therefore The correct answer is Rs. 340.

Alternate Method

Given:

Amount after 5 years (A5) = Rs. 457

Amount after 10 years (A10) = Rs. 574

Calculations:

=> Let the Principal be P and the annual Rate of Interest be R.

=> Amount = Principal + Simple Interest (SI)

=> SI for 5 years = (P × R × 5) / 100

=> SI for 10 years = (P × R × 10) / 100

=> P + (P × R × 10) / 100 = 574 −−− (i)

=> P + (P × R × 5) / 100 = 457 −−− (ii)

=> Subtracting (ii) from (i):

=> (P × R × 5) / 100 = 574 − 457

=> Simple Interest for 5 years = Rs. 117

=> Substituting this value in equation (ii):

=> P + 117 = 457

=> P = 457 − 117

=> P = 340

Therefore The correct answer is Rs. 340.

Additional Information

Simple Interest Formula

The basic formula for SI is (P × R × T) / 100, where P is Principal, R is Rate, and T is Time.

Amount Property

Amount (A) = Principal (P) + Interest (I). In SI, the Interest added every year remains constant because it is always calculated on the original Principal.

Rate of Interest Calculation

Once the Principal (P) and SI for 1 year (I) are known, the Rate (R) can be found using R = (I × 100) / P.

Q54. Answer: (c) Credit Information Bureau India Limited

The correct answer is Credit Information Bureau India Limited.

Key Points

Credit Information Bureau India Limited(CIBIL) is a credit information company.

• It is founded in year 2000 and its headquarter is in Mumbai, Maharashtra.

• It is established under Credit Information Companies (Regulation) Act, and authorised by RBI.

• Now it is known as TransUnion CIBIL as it is acquired by TransUnion (American consumer credit reporting agency) in 2016.

Additional Information

• Other credit information company of India are CRIF High Mark, Equifax, and Experian.

• The function of credit information company is to collect data from different creditors and generate a report of a particular consumer, which is helpful for the lender to understand whether the particular consumer is how much trust worthy and he will return the loan

Q55. Answer: (a) The collected information of both I and II statements is necessary

Shortcut Trick

To find Saturday's reading, we need both the starting point and ending point of the day.

From Statement II: Total pages = 450 and pages before Saturday = 300 (2/3 of 450). So, 150 pages are left for Saturday and Sunday.

From Statement I: Sunday morning = 50 pages (the last ones). This marks the end of Saturday's session.

Saturday Reading = (Remaining at start) − (Remaining at end) = 150 − 50 = 100 pages.

Therefore The correct answer is The collected information of both I and II statements is necessary.

Alternate Method

Given:

Total book length = 450 pages (from Statement II).

Pages read before Saturday = 2/3 of the book (from Statement II).

Pages read on Sunday = Last 50 pages (from Statement I).

Calculations:

=> Pages read before Saturday = 450 × (2/3) = 300 pages.

=> Pages remaining at the start of Saturday = 450 − 300 = 150 pages.

=> Since Statement I says Katir read the last 50 pages on Sunday, it means 50 pages were left after Saturday ended.

=> Pages read on Saturday = 150 (available) − 50 (left for Sunday) = 100 pages.

=> Since we used 450 and 2/3 (Statement II) and 50 (Statement I) to get the result, both statements are required.

Therefore The correct answer is The collected information of both I and II statements is necessary.

Additional Information

Data Sufficiency Basics

A question is solvable if the statements provide a unique value. If Statement I alone gives an answer, it is sufficient; if only both combined work, then both are necessary.

Fractional Parts

Remaining portion = 1 − Fraction read. In this case, 1 − 2/3 = 1/3 of the book remained for the weekend.

Interdependent Statements

When one statement provides the total (base) and the other provides a specific segment, they are often interdependent for multi-step arithmetic problems.

Q56. Answer: (d) Sikkim

The correct answer is Sikkim.

Key Points

• Kanchenjunga is the highest peak in India situated in Sikkim.

• Its height is about 8,586 meters.

• It is the 3rd highest mountain in the world.

• It is the natural habitat of Asian black bear, Red panda, white-bellied musk deer, chestnut-breasted partridge, blood pheasant, and snow leopard.

• There are total 14 protected areas in the regions of Kanchenjunga.

Important Points

• Khangchendzonga National Park is a National Park and a Biosphere reserve in Sikkim listed in UNESCO World Heritage Sites in July 2016.

• It is the India's first mixed heritage site, also included in UNESCO Man and the Biosphere Programme.

Additional Information

• Nanda Devi is the 2nd highest peak in India situated in Chamoli district of Uttarakhand.

• It is the part of Garhwal Himalayas.

• Its height is about 8,126 meters.

• Nanda Devi National Park is located in the regions of Nanda Devi peak is was a included in UNESCO World Heritage Site since 1988.

• Pir Panjal Range is a mountains range in the Lesser Himalayan region in Himachal Pradesh.

• Tawang is a Hill station in Arunachal Pradesh famous for Tawang Monastry which is the is the largest monastery in India.

Q57. Answer: (a) 2.75

Concept:

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

Calculations :

4.5 – [2 – 0.25 {4 – 6 ÷ (2.7 – 0.7)}] = ?

=> 4.5 – [2 – 0.25 {4 – 6 ÷ 2}] = ?

=> 4.5 – [2 – 0.25 {4 – 3}] = ?

=> 4.5 – [2 – 0.25 {1}] = ?

=> 4.5 – [2 – 0.25] = ?

=> 4.5 – [1.75] = ?

=> 4.5 – 1.75 = ?

=> 2.75 = ?

Therefore ? = 2.75

Q58. Answer: (a) 20

Shortcut Trick

The series consists of two alternating patterns.

Odd-placed terms (1^(st), 3^(rd), 5^(th)...): 22, 26, 30, 34, 38 (Add 4).

Even-placed terms (2^(nd), 4^(th), 6^(th)...): 4, 8, 12, 16, ? (Add 4).

Missing term is the 10^(th) term (even-placed): 16 + 4 = 20.

Therefore The correct answer is 20.

Alternate Method

Given Series: 22, 4, 26, 8, 30, 12, 34, 16, 38, ?

22

−18

→

4

+22

→

26

−18

→
8
+22
→
30
−18
→
12
+22
→
34
−18
→
16
+22
→
38
−18
→
20

The logic is a repeating subtraction and addition sequence.

=> 22 − 18 = 4
=> 4 + 22 = 26
=> 26 − 18 = 8
=> 8 + 22 = 30
=> 30 − 18 = 12
=> 12 + 22 = 34
=> 34 − 18 = 16
=> 16 + 22 = 38
=> 38 − 18 = 20

Therefore The correct answer is 20.

Additional Information

Alternating Series

This series combines two separate sequences into one. Identifying the odd and even positions separately often reveals simpler arithmetic progressions.

Common Difference Patterns

Look for patterns in the differences between consecutive terms. If the differences repeat or follow a logical order, the next term can be predicted using the same increment or decrement.

Arithmetic Series

A sequence where the difference between any two consecutive terms is constant. In this case, both sub-series have a constant difference of +4.

Q59. Answer: (b) 66

Shortcut Trick

Let Total Work be LCM(11, 16.5, 5.5, 22) = 66 units.

Efficiency: A = 6, B = 4, A+B+C = 12 => C = 12 − (6 + 4) = 2 units/day.

Efficiency: C+D = 66 ÷ 22 = 3 units/day => D = 3 − 2 = 1 unit/day.

Time taken by D = 66 ÷ 1 = 66 days.

Therefore The correct answer is 66 days.

Alternate Method

Given: Time for A = 11 days, B = 16.5 days, A+B+C = 5.5 days, C+D = 22 days.

Formula Used: Efficiency = Total Work ÷ Time Taken

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Person	Days	Total Work	Efficiency
A	11	66	6
B	16.5	4	
A+B+C	5.5	12	

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

=> Efficiency of C = 12 − 6 − 4 = 2 units/day.

=> Efficiency of (C+D) = 66 ÷ 22 = 3 units/day.

=> Efficiency of D = Efficiency of (C+D) − Efficiency of C = 3 − 2 = 1 unit/day.

=> Time taken by D alone = Total Work ÷ Efficiency of D = 66 ÷ 1 = 66 days.

Therefore The correct answer is 66 days.

Additional Information

Total Work Concept

Total work is generally assumed to be the Least Common Multiple (LCM) of the number of days taken by individuals to make calculations easier.

Efficiency Relationship

Efficiency is inversely proportional to the time taken. If time taken is in the ratio x:y, efficiency will be in the ratio y:x.

Combined Work Formula

For two people A and B, combined time taken = (A × B) ÷ (A + B). For three people, 1/T = 1/A + 1/B + 1/C.

Q60. Answer: (b) Andhra Pradesh

The correct answer is Andhra Pradesh.

Key Points

• World's first thermal battery making facility was inaugurated in Andhra Pradesh.

Important Points

• Bharat Energy Storage Technology Pvt. Ltd(BEST) is the manufacture of the thermal battery in India.

• It is the source of renewable energy and helps to provide energy to remote areas.

• These batteries are used in telecom sector, mini/micro grids, and electric buses.

Q61. Answer: (a) 20

The correct answer is 20 m/s.

Key Points

• As we know 1 Km = 1000 m and 1 hour = 3600 seconds

• 72 Km/hr = 72 x 1000/3600 = 20 m/s.

• So the converted velocity is 20 m/s.

Q62. Answer: (c) Part III

The correct answer is Part III.

Key Points

• Part III, articles 12 to 35 of the Indian Constitution deals with Fundamental Rights.

• Article 21 of the Indian Constitution says that "No person shall be deprived of his life or personal liberty except according to the procedure established by law". Hence, the phrase personal liberty is all about privacy

• This article can not be suspended at a time of emergency.

• Fundamental Rights are borrowed from the Bill of Rights of the United States.

Additional Information

• Part IV, articles 36 to 51 of the Indian Constitution deals with Directive principles of state policy.

• Part I, articles 1 to 4 of the Indian Constitution deals with The Union and its Territory.

• Part II, articles 5 to 11 of the Indian Constitution deals with Citizenship.

Q63. Answer: (c) Q / t

The correct answer is Q / t.

Key Points

• Electric current is defined as the rate of flow of charge per unit time.

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• The S.I. unit of current is Ampere.
• It is a scalar quantity, and its symbol is "I".
• Ammeter is a measuring instrument use to measure electric current.
Additional Information
• Charge is the basic property of matter by the virtue of which it produces or experiences electric and magnetic effects.
• The S.I. unit of Charge is Coulomb.
• The S.I. unit of time is Second.

Q64. Answer: (c) 5/24

Given:
We have to find the difference between 25/12 and 1/58
Concept Used:
Concept of fractional subtraction
Calculation:
25/12 - 1/58
=> (50 - 45)/24
=> 5/24
Therefore The required difference between 25/12 and 1/58 is 5/24.

Q65. Answer: (c) 22.25

Shortcut Trick
Total numbers = 13, Overall Average = 21.
Smallest 5 average = 19 (Deviation = 19 − 21 = −2).
Total deviation for 5 numbers = 5 × (−2) = −10.
To balance, 8 largest numbers must have a total deviation of +10.
Average deviation for 8 numbers = 10 ÷ 8 = 1.25.
Mean of 8 largest numbers = 21 + 1.25 = 22.25.
Therefore The correct answer is 22.25.
Alternate Method
Given:
Total observations (n) = 13
Mean of 13 numbers = 21
Mean of 5 smallest numbers = 19
Formula Used:
Sum of observations = Average × Number of observations
Average of remaining = (Total Sum − Sum of known) ÷ Remaining count
Calculations:
=> Total sum of 13 numbers = 13 × 21 = 273
=> Sum of 5 smallest numbers = 5 × 19 = 95
=> Sum of 8 largest numbers = 273 − 95 = 178
=> Mean of 8 largest numbers = 178 ÷ 8 = 22.25
Therefore The correct answer is 22.25.
Additional Information
Arithmetic Mean
The sum of all values divided by the number of values: Mean = Σx ÷ n.
Weighted Average Formula
When two groups are combined: Avg_(total) = (n1×A1 + n2×A2) ÷ (n1 + n2).
Deviation Principle
The sum of deviations of all observations from their arithmetic mean is always zero.

Q66. Answer: (a) Taj Mahal

The correct answer is Taj Mahal.
Key Points

• Agra is know for Taj Mahal (Tomb of Mumtaz Mahal, built by the Mughal emperor Shah Jahan for the memory of his favourite wife).

• The Taj Mahal is in the list of UNESCO World Heritage Site since 1983.

• Ustad Ahmad Lahauri was the chief architect of Taj mahal.

• Construction of Taj Mahal was started in AD 1632 and was completed in late 1648 AD

Important Points

• Agra Fort is a historical fort in the city of Agra in India. It was the main residence of the emperors of the Mughal Dynasty until1638.

• Moti Masjid inside Agra Fort was built by Mughal emperor Shah jahan.

• The tomb of Akbar is at sikandra, approximately 8 km from main city of Agra.

• Fatehpur Sikri is a town in the Agra District, known for Buland Darwaza, and Tomb of Salim Chishti, the city itself was founded as the capital of Mughal Empire in 1571 by Emperor Akbar to 1585.

Additional Information

• Red Fort was built by Mughal emperors Shah Jahan.

• Construction of Red Fort was started in AD 1639 and was completed in late 1648 AD.

• Ustad Ahmad Lahauri was the chief architect of Red Fort.

• Moti Masjid inside Red Fort, Delhi was built by Aurangzeb.

• Red Fort is in the list of UNESCO World Heritage Site since 2007.

• Qutub Minar is the world's tallest minaret built of bricks.

• The height of Qutb Minar is about 73 meters.

• The construction of Qutub Minar was started by Qutb-ud-din Aibak (Founder of the Slave Dynasty) and completed by Shamsuddin Iltutmish(Second ruler of Slave Dynasty).

• The topmost storey was built by Firoz Shah Tughlaq of Tughlaq Dynasty.

• Qutub Minar is in the list of UNESCO World Heritage Site.

Q67. Answer: (b) West

According to the conditions,

The lady starts sweeping from her right. She ends up towards the south.

Then she starts sweeping 90° towards her right then the broom will end up pointing towards the west.

So, the broom is in the west direction now.

Hence, ‘West’ is the correct answer.

Q68. Answer: (c) Gujrat

The correct answer is Gujrat.

Key Points

• Narendra Modi was the four term Chief Minister of Gujrat state during the tenure from 2001 to 2014.

• He was elected Member of legislative assembly from Rajkot Pashchim for the first term and from Maninagar for the rest three term from 2001 to 2014.

• Narendra Modi is the current Prime Minister of India.

• He is serving as Prime Minister since 2014.

• He is the elected Member of Parliament from Varanasi constituency of Uttar Pradesh.

Important Points

• Current Chief Minister of Gujrat state is Bhupendra Patel and Governer is Acharya Devvrat.

• Capital of Gujrat is Gandhinagar.

Additional Information

State	Capital	Chief Minister	Governor
Bihar	Patna	Nitish Kumar	Phagu Chauhan
Uttar Pradesh	Lucknow	Yogi Aditya nath	Anandiben Patel
Rajasthan	Jaipur	Ashok Gehlot	Kalraj Mishra

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Q69. Answer: (c) 35 hours

Shortcut Trick

Net efficiency = Efficiency of A − Efficiency of B

Combined time to fill full tank = (35 × 70) ÷ (70 − 35) = 70 hours

To fill half the tank, time taken = 70 ÷ 2 = 35 hours

Therefore The correct answer is 35 hr.

Alternate Method

Given: Filling time of Tap A = 35 hours, Emptying time of Tap B = 70 hours.

Formula Used: Total Work = LCM of time taken; Efficiency = Total Work ÷ Time.

Person	Days	Total Work	Efficiency
Tap A (Fill)	35	70 Units	+2
Tap B (Empty)	70	−1	

=> Net efficiency of both taps = 2 − 1 = 1 unit/hr

=> Capacity of half the tank = 70 ÷ 2 = 35 units

=> Time required to fill the half empty tank = 35 ÷ 1 = 35 hours

Therefore The correct answer is 35 hr.

Additional Information

Pipes and Cisterns Efficiency

Filling taps have positive efficiency, while emptying (outlet) taps have negative efficiency in net work calculations.

Net Time Formula

If one pipe fills in x hours and another empties in y hours (where y > x), the net time to fill the tank is (xy) ÷ (y − x).

Q70. Answer: (d) Lord Dalhousie

The correct answer is Lord Dalhousie.

Key Points

• " Doctrine of lapse" is an annexation policy implemented by Lord Dalhousie.

• The policy states that any Indian princely state under the British East India Company would have this status abolished if the ruler is not able to compete or does not have any male heir.

• Some of the important princely states that were annexed under the doctrine of lapse were -

1. Jhansi
2. Kurnool
3. Nagpur
4. Ramgarh
5. Surat

Important Points

• Lord Dalhousie was born on 22nd April 1812.

• His full name was James Andrew Broun Ramsay.

• Some important organizations founded by him include -

1. Central public works department
2. Tamil Nadu public works department.

Q71. Answer: (d) 50 paisa

Shortcut Trick

For a period of 1 year, the interest compounded half-yearly at 10% p.a. is equivalent to two cycles of 5% interest.

The extra interest earned is the interest on interest for the second half-year.

Extra Interest = P × $(r/100)^2$, where r is the rate per half-year (5%).

Extra Interest = 200 × $(5/100)^2$ = 200 × (25 ÷ 10000) = 5000 ÷ 10000 = Rs. 0.50.

Conversion: Rs. 0.50 = 0.50 × 100 = 50 paisa.

Therefore The correct answer is 50 paisa.

Alternate Method

Given: Principal (P) = Rs. 200, Annual Rate (R) = 10%, Time (T) = 1 year.

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Plan 1 (Compounded Annually):

=> Interest (I1) = (P × R × T) ÷ 100

=> I1 = (200 × 10 × 1) ÷ 100 = Rs. 20.00

Plan 2 (Compounded Half-Yearly):

=> New Rate (r) = 10% ÷ 2 = 5% per half-year; Periods (n) = 2

=> Interest (I2) = P × [(1 + r/100)^n − 1]

=> I2 = 200 × [(1 + 5/100)^2 − 1] = 200 × [1.1025 − 1]

=> I2 = 200 × 0.1025 = Rs. 20.50

Comparison:

=> Difference = I2 − I1 = 20.50 − 20.00 = Rs. 0.50

=> Difference in paisa = 0.50 × 100 = 50 paisa

Therefore The correct answer is 50 paisa.

Additional Information

Effective Annual Rate (EAR)

When interest is compounded half-yearly, the effective rate is higher than the nominal rate. EAR = [1 + (R/n)]^n − 1, where n is the number of compounding periods.

CI and SI Difference (2 years)

The difference between Compound Interest and Simple Interest for 2 years (or 2 cycles) is given by D = P × (R/100)^2.

Compounding Frequency

As the frequency of compounding increases (yearly → half-yearly → quarterly → monthly), the total interest earned on the same principal also increases.

Q72. Answer: (c) R K Narayan

The correct answer is R.K Narayan.

Key Points

• Swami and Friends is a novel that was published in the year 1935.

• The book was originally published in the English language.

• It is a fictional book consisting of 459 pages.

• The television drama series " Malgudi days" is based on this novel.

• The novel was listed in 2019 under the " 100 most influential novels".

Important Points

• R.K Narayan was born on 10th October 1906 in the Madras presidency.

• His full name is Rasipuram Krishnaswami Iyer Narayanaswami.

• He has been awarded the following awards -

1. Filmfare award for best story.

2. Padma Bhushan

3. Padma Vibhushan.

Q73. Answer: (c) Red

The correct answer is Red.

Key Points

• Sulphuric acid is also known as the oil of vitriol.

• It is composed of sulfur, hydrogen, and oxygen element.

• The acid has a very strong acidic nature.

• It has several uses such as fertilizer manufacture, mineral processing, oil refining, and wastewater processing.

• It is also known by the name hydrogen sulfate.

Important Points

• The litmus solution is a purple dye solution.

• It is extracted from the plant called " Lichen".

• It is used as an acid-base indicator.

Q74. Answer: (a) b

On observing all the figure all have even number of spikes while the figure in option B has odd numbers of spikes.

Hence, Figure b is the odd among all

Q75. Answer: (a) 3

Shortcut Trick

Regular polygons can recursively form patterns (tessellate) only if their interior angles are exact divisors of 360°.

1. Equilateral Triangle: 60° (360 ÷ 60 = 6)

2. Square: 90° (360 ÷ 90 = 4)

3. Regular Hexagon: 120° (360 ÷ 120 = 3)

No other regular polygon satisfies this condition as their angles do not divide 360° evenly.

Therefore The correct answer is 3.

Alternate Method

Given: Regular polygons sharing arms (sides) recursively to fill a plane without gaps or overlaps.

Formula Used: Interior Angle of a regular n-gon = ((n − 2) × 180) ÷ n

=> For n = 3 (Triangle): Angle = ((3 − 2) × 180) ÷ 3 = 60°. Since 360 ÷ 60 = 6 (integer), it tiles.

=> For n = 4 (Square): Angle = ((4 − 2) × 180) ÷ 4 = 90°. Since 360 ÷ 90 = 4 (integer), it tiles.

=> For n = 5 (Pentagon): Angle = ((5 − 2) × 180) ÷ 5 = 108°. 360 ÷ 108 ≈ 3.33 (not integer), it cannot tile.

=> For n = 6 (Hexagon): Angle = ((6 − 2) × 180) ÷ 6 = 120°. Since 360 ÷ 120 = 3 (integer), it tiles.

=> For n > 6: The interior angle is > 120° but < 180°, so 360 ÷ Angle is between 2 and 3, which is never an integer.

Therefore The correct answer is 3.

Additional Information

Q76. Answer: (b) Steering

Book : Chapter → Chapters are found inside a book.

Similarly,

Car : ? → A steering is found inside a car.

Hence, ‘steering’ is the correct answer.

Q77. Answer: (c) Only conclusion I follows

I. Counseling is one of the ways to correct behavioral problems.

It can be concluded from the statement as the statement itself mentions that the child needs to be counselled for his bad behaviour.

II. Counseling is the only way to correct the behavior.

It cannot be concluded as there are other better ways too to correct the bad behaviour of a student.

Hence, only conclusion I follows.

Q78. Answer: (d) Cross-section area

The correct answer is cross-section wire.

Key Points

• Resistance is a property of an electric circuit.

• It transforms electrical energy into heat energy.

• The reciprocal of resistance is conductance.

• The SI unit of resistance is the ohm.

• The unit is named after the German physicist George ohm.

• The electrical resistance is measured by two methods namely constant current or constant voltage.

Important Points

• The resistance of a wire depends upon the material of the wire.

• It is directly proportional to the length of the wire.

• And is inversely proportional to the cross-section area.

Q79. Answer: (a) 1000 m / s

The correct answer is 1000 m /s.

Key Points

• The sound waves are a type of longitudinal waves.
• These waves travel through a medium like air or water.
• sound waves can also be categorized into mechanical waves or pressure waves.
• Some of the examples of longitudinal waves are Tsunami waves, clapping, and earthquakes.

Important Points

• To calculate the speed of sound waves, the formula will be calculated as -

Speed = wavelength x frequency.

• The wavelength can be defined as the distance between two successive crests or two successive troughs.
• Frequency can be defined as the number of waves that pass through a fixed point in a definite amount of time.

Q80. Answer: (b) 1.43 s

The correct answer is 1.43 s.

Key Points

• In order to calculate the time taken by the object to the highest point, we have to calculate the initial velocity of the object.
• To calculate the initial velocity, we have to use the formula $v^2 - u^2 = 2gs$.
• Here, v is the final velocity and u is the initial velocity with which the object was thrown up.
• To calculate the time, we have to use the formula v = u + gt.
• Here, t = v - u / g.

Solution:

Initial Speed (u) = 14 m/s

Final speed (v) = 0 m/s

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

we know,

=> v = u + gt

=> 0 = (14) + (- 9.8) × t

=> 14 = 9.8t

=> t = 1.42 s

Important Points

• G is gravity constant.
• The value of G is 6.67430 (15) x 10^(-11).
• It is also known as the Newtonian constant of gravitation.

Q81. Answer: (b) Both 1 and 2 are sufficient

Shortcut Trick

If the determinant of matrix A is non-zero, the equation AB = A implies that B must be the Identity Matrix (I).

From statement 1, we get the elements of A and the structure of B. From statement 2, we get the relation.

Since matrix A is non-singular (1×1 − 2×3 = −5), B = I => z = 1.

Both statements are required to confirm the non-singular nature and solve the equation.

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

Alternate Method

Given:

Statement 1: A = 1 2 ; 3 1 and B = 1 0 ; 0 z

Statement 2: AB = A

Calculations:

=> Step 1: Perform matrix multiplication of A and B using statement 1.

=> AB = 1 2 ; 3 1 × 1 0 ; 0 z = (1 × 1 + 2 × 0) (1 × 0 + 2 × z) ; (3 × 1 + 1 × 0) (3 × 0 + 1 × z)

=> AB = 1 2z ; 3 z

=> Step 2: Use statement 2 (AB = A) to equate the corresponding elements.

=> 1 2z ; 3 z = 1 2 ; 3 1

=> Comparing a12: 2z = 2 => z = 1

=> Comparing a22: z = 1

=> Since both statements were used to find the specific value of z, both are sufficient.

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

Additional Information

Identity Matrix Property

For any square matrix A, the Identity Matrix (I) satisfies AI = IA = A. If A is invertible, then AB = A always implies B = I.

Determinant and Invertibility

A matrix is non-singular (invertible) if its determinant |A| ≠ 0. For a 2×2 matrix, |A| = (a11 × a22) − (a12 × a21).

Matrix Equality

Two matrices are equal if and only if they have the same dimensions and every pair of corresponding elements is equal.

Q82. Answer: (d) 7/40

Given:

Difference between 3/8 and smaller number = 1/5

Calculation:

Let the another number be 'x'

=> (3/8) - x = 1/5

=> (3/8) - (1/5) = x

=> x = (15 - 8)/40

=> x = 7/40

Therefore The another number is 7/40.

Q83. Answer: (b) Australia

The correct answer is Australia.

Key Points

• The commonwealth games is an international event that involves different nations.

• It was first held in the year 1930.

• Earlier it was known by different names such as British empire games, the British empire and commonwealth games, and British commonwealth games.

• Some of the important games that are played in this event include Badminton, Athletics, Boxing, Basketball, and Cricket.

Important Points

• The capital of Australia is Canberra.

• It has a parliamentary form of government in which the upper house is the senate and the lower house is the House of representatives.

• The country is a member of several organizations such as the United Nations, OECD, World trade organization, and ANZUS.

Q84. Answer: (d) Sarbananda Sonowal

The correct answer is Sarbananda Sonowal.

Key Points

• Sarbananda Sonowal was born on 31st October 1961 in Dibrugarh.

• He belongs to the Bhartiya Janta Party.

• He has also served as the union minister for sports and youth affairs.

• Currently, he is serving as the 14th CM of the state.

• Earlier he has been appointed as a member of the consultative committee of the ministry of home affairs, a national executive member of BJP, and a member of the consultative committee of the ministry of commerce and industry.

Important Points

• The capital of Assam is Dispur.

• It is a north-eastern state.

• The state is famous for Assam tea and Assam silk.

• The state was formed on 26th January 1950.

Q85. Answer: (d) ABC

Calculation:

School XYZ, Passing percentage in different years are:

2012-13 = 78, 2013-14 = 69, 2014-15 = 81, and 2015-16 = 92

In 2013 - 14 performance decrease from previous year.

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School ABC

2012 - 13 = 61, 2013 - 14 = 72, 2014 - 15 = 84, 2015 - 16 = 96

In every year performance increase

School PQR

2012 - 13 = 81, 2013 - 14 = 92, 2014 - 15 = 85, 2015 - 16 = 97

In 2014 - 15 performance decrease from previous year.

School TUV

2012 - 13 = 92, 2013 - 14 = 69, 2014 - 15 = 72, 2015 - 16 = 95

In 2013 - 14 performance decrease from previous year.

Therefore Clearly School ABC performance increase every year.

Q86. Answer: (b) 1.5 kg

Shortcut Trick

Initial Ratio (Sand : Cement) = 7 : 1 (Total 8 units)

8 units = 72 kg → 1 unit = 9 kg. So, Sand = 63 kg, Cement = 9 kg.

New Ratio = 6 : 1. Since only cement is added, sand remains constant at 63 kg.

6 units of sand = 63 kg → 1 unit of cement = 10.5 kg.

Cement added = 10.5 kg − 9 kg = 1.5 kg.

Therefore The correct answer is 1.5 kg.

Alternate Method

Given: Initial mixture weight = 72 kg, Ratio of Sand : Cement = 7 : 1.

=> Quantity of Sand = (7/8) × 72 = 63 kg

=> Quantity of Cement = (1/8) × 72 = 9 kg

=> Let x kg of cement be added to the mixture.

=> New Ratio = 63 / (9 + x) = 6 / 1

=> 63 = 6 × (9 + x)

=> 63 = 54 + 6x

=> 6x = 9

=> x = 9/6 = 1.5 kg

Therefore The correct answer is 1.5 kg.

Additional Information

Constant Quantity Rule

In a mixture, if only one component is added or removed, the quantity of the other component remains constant. Use this to equate the component before and after the change.

Alligation Method

Mixture problems can also be solved using alligation by taking the concentration of the added substance (pure cement is 100% or ratio 1/1) against the initial mixture concentration.

Ratio Balancing

Make the part representing the constant substance (Sand) equal in both ratios by finding their LCM to calculate the change in the other substance directly.

Q87. Answer: (b) Fallopian tube

The correct answer is the Fallopian tube.

Key Points

• The process of fertilization in the human body involves the union of human eggs and sperm in the fallopian tube.

• Later it leads to the formation of a zygote cell or fertilizes an egg.

• There is another process called IVF that stands for " In Vitro fertilization".

• In IVF the egg cells are fertilized by the sperm outside the womb.

• The process of fertilization in human beings begins with ejaculation during copulation and ovulation.

Important Points

• The fallopian tube is also called a uterine tube or salpinges.

• It helps in the transportation of ova from the ovary to the uterus.

• The tube was named after the Italian anatomist Gabriele Falloppio.

Q88. Answer: (a) Gujarat

The correct answer is Gujarat.

Confusion Points

• This is previous year question and according to board the correct answer is Gujarat.

• But, As on 17th September 2021, Maharashtra is leading in cotton acreage with 39.41 lakh ha followed by Gujarat (22.51 lakh ha), Telangana (18.78 lakh ha), Rajasthan (7.08 lakh ha) and Haryana (6.88 lakh ha).

Key Points

• Cotton is a type of cellulose fiber.

• Some important sources of cotton include Gossypium herbaceum, Gossypium arboreum, and Sea island cotton.

• Cotton has several uses such as fishing net, bookbinding, cotton paper, cotton filter, tent, etc.

• Some important characteristics of cotton include absorbent, lightweight, and softness.

Important Points

• World cotton day is celebrated on 7th October.

• The organization " Cotton corporation of India" was founded on 31st July 1970.

• Its headquarter is in Mumbai.

Q89. Answer: (d) 264/65

Given:

5/13 + 1/3 5

Calculation:

5/13 + 1/3 5

=> (5/13) + (13/5)

=> (25 + 169)/65

=> 194/65

=> 264/65

Therefore The value is 264/65.

Q90. Answer: (c) Uttar Pradesh

The correct answer is Uttar Pradesh.

Key Points

• Shahzar Rizby was born on 18th June 1994.

• He is an Indian professional shooter.

• ISSF stands for international shooting for sports federation.

• Its headquarter is in Munich, Germany.

• It was founded in the year 1907 and its president is Vladimir Lisin.

Important Points

• Some important competitions recognized by ISSF includes -

1. Olympic games

2. ISSF World shooting championship.

3. ISSF world cup.

4. ISSF junior world cup.

Q91. Answer: (c) Only conclusion I follows

I. There are various traditional weaving methods.

It can be concluded as the statement mentions to develop our traditional weaving methods by promoting handicraft.

II. Handicraft products are not affordable for the general public.

It cannot be concluded as there is no data given related to price of the handicraft products.

Hence, only conclusion I follows.

Q92. Answer: (b) (11x - 1)(9x + 1) = 0

Shortcut Trick

To find the quadratic equation from its roots, convert each root x = a/b into a factor (bx − a) = 0.

For root x = 1/11, the factor is (11x − 1).

For root x = −1/9, the factor is (9x − (−1)) = (9x + 1).

The required equation is the product of these two factors.

Therefore The correct answer is (11x − 1)(9x + 1) = 0.

Alternate Method

Given:

First root (x1) = 1/11

Second root (x2) = −1/9

Formula Used:

A quadratic equation can be represented in factored form as (x − x1)(x − x2) = 0.

Calculations:

=> x = 1/11

=> 11x = 1

=> 11x − 1 = 0

=> x = −1/9

=> 9x = −1

=> 9x + 1 = 0

=> Combining both linear factors to form the equation:

=> (11x − 1) × (9x + 1) = 0

=> (11x − 1)(9x + 1) = 0

Therefore The correct answer is (11x − 1)(9x + 1) = 0.

Additional Information

General Form of Quadratic Equation

The standard form is ax2 + bx + c = 0. It can also be written using sum of roots (S) and product of roots (P) as x2 − Sx + P = 0.

Nature of Roots

The discriminant D = b2 − 4ac determines the nature of roots. If D > 0, roots are real and distinct; if D = 0, roots are real and equal; if D < 0, roots are complex/imaginary.

Relationship with Coefficients

For ax2 + bx + c = 0, the sum of roots (α + β) = −b/a and the product of roots (αβ) = c/a.

Q93. Answer: (a) Sanjay Leela Bhansali

The correct answer is " Sanjay Leela Bhansali".

Key Points

• Padmaavat's movie was directed by Sanjay Leela Bhansali.

• The actors who participated in this movie includes Shahid Kapoor, Deepika Padukone, and Ranveer Singh.

• The movie was released on 25th January 2018.

• It was a big-budget film.

• Some other people that were involved in this film were Ujjawal Chopra, Aditi Rao hydradi, and Raza Murad.

Important Points

• Sanjay Leela Bhansali was born on 24th Feb 1963.

• He is a director, producer, and screenwriter.

• He has got several awards such as Padma Shri, Zee gold award, and screen award for best director.

Q94. Answer: (b) Peter Sutherland

The correct answer is Peter Sutherland.

Key Points

• Peter Denis Sutherland was born on 25th April 1946.

• Earlier he has served as the UN special representative for international migration from 2006 to 2017.

• He was the chairman of Allied Irish Banks (AIB).

• He has also got fifteen honorary doctorates from the universities of Europe and America.

Important Points

• Some other positions held by him include -

1. Attorney General of Ireland.

2. Goodwill Ambassador for the United Nations Industrial Development Organization.
3. Chairman of Goldman Sachs international.

Q95. Answer: (a) 6

The number of squares in the following figure is shown below:
Hence, ‘6’ is the correct answer.

Q96. Answer: (d) Snake

All options except ‘snake’ are methods of sharing information or exchanging conversation while snake is a reptile.
Hence, ‘snake’ is the odd one out.

Q97. Answer: (b) Spanish

The correct answer is Spanish.
Key Points
• Spanish is a roman language.
• It is the world's second most spoken native language.
• It is one of the official languages of the European Union.
• It is also known as Castilian or Castellano.
• Some important country's that uses this language includes -
1. Mexico
2. United States
3. Chile
4. France
5. Brazil
6. Australia
7. Poland
8. Switzerland
9. Ireland
10. Finland.

Q98. Answer: (c) 3.43

Shortcut Trick
Average Speed = Total Distance ÷ Total Time
Total Distance = 3 + 2 + 2 = 7 km
Total Time = (3/8) + (2/3) + (2/2) = 0.375 + 0.667 + 1 = 2.042 hours
Average Speed = 7 ÷ 2.042 ≈ 3.43 km/h
Therefore The correct answer is 3.43 km/h.
Alternate Method
Given:
Distance 1 (d1) = 3 km, Speed 1 (v1) = 8 km/h
Distance 2 (d2) = 2 km, Speed 2 (v2) = 3 km/h
Distance 3 (d3) = 2 km, Speed 3 (v3) = 2 km/h
Formula Used:
Average Speed = (Total Distance) / (Total Time)
Time = Distance / Speed
Calculations:
=> Total Distance = 3 + 2 + 2 = 7 km
=> Time t1 = 3/8 hours
=> Time t2 = 2/3 hours
=> Time t3 = 2/2 = 1 hour
=> Total Time = (3/8) + (2/3) + 1
=> Total Time = (9 + 16 + 24) / 24 = 49/24 hours
=> Average Speed = 7 ÷ (49/24)

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=> Average Speed = (7 × 24) / 49

=> Average Speed = 24 / 7 ≈ 3.428... km/h

Therefore The correct answer is 3.43 km/h.

Additional Information

Average Speed Formula

For different distances and speeds, Average Speed = Total Distance ÷ Total Time. Never take the arithmetic mean of speeds unless times are equal.

Harmonic Mean Case

If a journey is divided into equal distances (d1 = d2) with speeds v1 and v2, the Average Speed = 2v1v2 / (v1 + v2).

Arithmetic Mean Case

If a person travels at different speeds for equal time intervals, the Average Speed is simply the arithmetic mean: (v1 + v2) / 2.

Q99. Answer: (c) Mass

The correct answer is Mass.

Key Points

• Mass is one of the fundamental properties of the matter.

• The SI unit of mass is Kg.

• The mass of an object helps to determine the strength of its gravitational attraction to the other bodies.

• Force is the phenomenon of pushing or pulling an object.

Additional Information

• The SI unit of force is Newton.

• Acceleration can be defined as the rate of change of velocity of an object with respect to time.

• The SI unit of acceleration is m/s^2.

• Acceleration is a vector quantity.

Q100. Answer: (d) D

The series is rotating in 90^oclockwise direction.

Hence, ‘option 4’ is the correct answer.

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