RRC Group D Previous Year Paper 39 (Held On: 12 Oct 2018 Shift 3)

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

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CBT

Q1. Which of the following is an example of the conversion of electrical energy into mechanical energy?

(a) Iron box
(b) Television
(c) Torch
(d) Electric fan

Q2. Murali Ramaswami has been appointed as the executive Director of _____

(a) Vijaya Bank
(b) Andhara Bank
(c) State Bank of India
(d) Reserve Bank of India

Q3. Find the compound interest on Rs. 15,625 for 1 year 6 months at 8% per annum, when compounded half-yearly?

(a) Rs. 1,900
(b) Rs. 1,950
(c) Rs. 1,952
(d) Rs. 1,951

Q4. The National War Memorial is proposed to be erected in

(a) Madhya Pradesh
(b) Mumbai
(c) Srinagar
(d) New Delhi

Q5. A lump of metal 136 cu.cm and weighing 207 gms is hammered into a square sheet of 2 cm long. Find the weight of an exact cube out of from the metal sheet?

(a) 14 gms
(b) 15 gms
(c) 12.17 gms
(d) 11 gms

Q6. The potential difference is 12 V and the work done is 60 J. Find the electric charge that flow through the circuit.

(a) 0.5 C
(b) 50 C
(c) 500 C
(d) 5 C

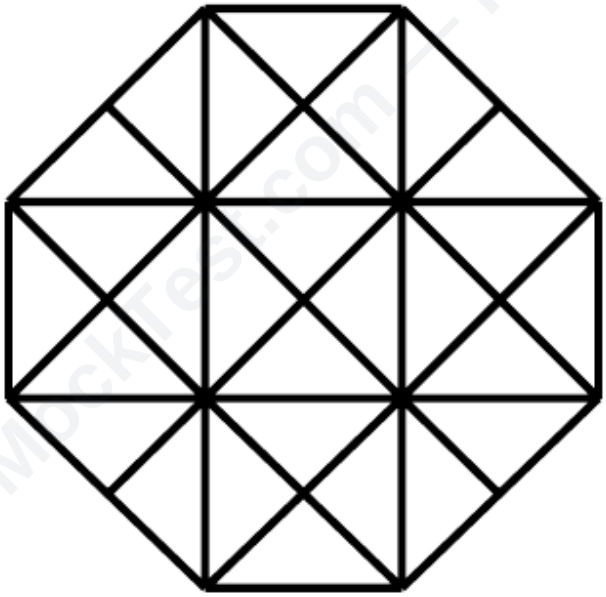
Q7. Which of the following statements is/are true?

A. If we decrease temperature and increase pressure, we can liquefy atmospheric gases.

B. A hot dry day means the temperature of the atmosphere is high and the humidity of air is low, Both these factors increase the rate of evaporation and thus enormous cooling is produced.

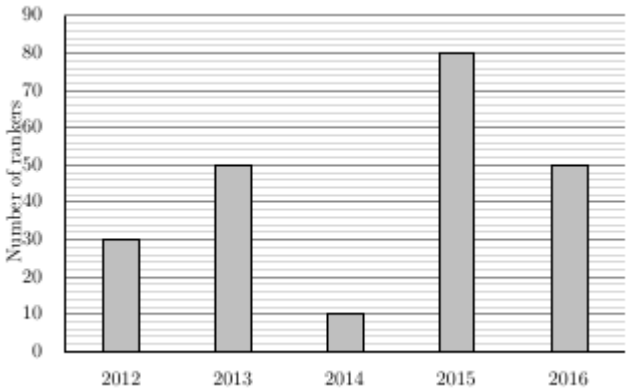
(a) Only B is true
(b) Both are false
(c) Only A is true
(d) Both are true

Q8. What is the count of the smallest triangular units presents in the following figure?



(a) 22
(b) 26
(c) 28
(d) 24

Q9. The following Bar graph shows information about results in the national level entrance exam by the institute “ABC” for the last 5 years.



In the year 2014 how many ranks were scored from institute “ABC”?

(a) 10
(b) 30
(c) 20
(d) 40

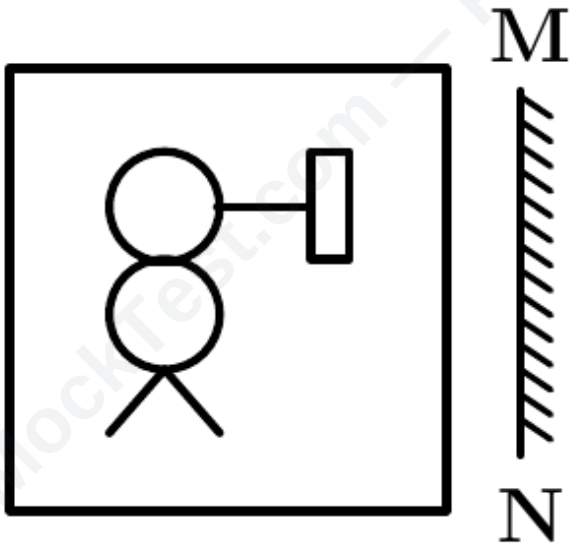
Q10. Which of the following statements is/are true of sound in different media at 25 °C?

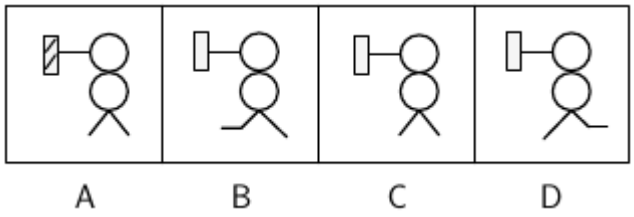
A. In Aluminium, speed of sound is 6420 m/s

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

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

Q11. Choose the mirror image for the following figure:





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

Q12. Which of the following forces is NOT electromagnetic in nature?

(a) Force of friction
(b) Tension in a string
(c) Electrical force in spring
(d) Weight of body

Q13. Which of the following peaks is the highest peak of India?

(a) Mount Kanchenjunga
(b) Nanda Devi
(c) Kamet Peak
(d) Mount Everest

Q14. The, statement below is followed by two assumptions, numbered I and II. You have to consider the statement and the following assumptions and decide which of the assumptions is/are implicit in the statement.

Statement: The journey of a thousand miles starts with the first step.

Assumptions:

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I. An initiative has to be taken to move further.

II. People stop themselves from starting something with, due to financial concerns.

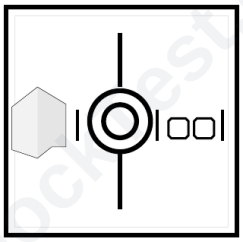
(a) Both assumptions I and II are implicit
(b) Only assumption II is implicit
(c) Only assumption I is implicit
(d) Neither assumption I nor II is implicit

Q15. x and y, given correct to 2 decimal place, are given as 4.51 and 2.48 respectively. What is the upper bound of the value of x + y?

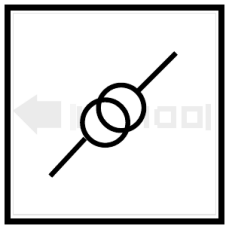
(a) 7.012
(b) 7.010
(c) 6.990
(d) 6.995

Q16. Choose the odd figure from the series.

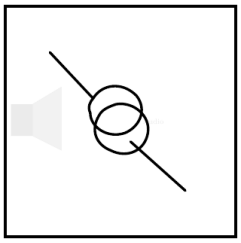
(a)



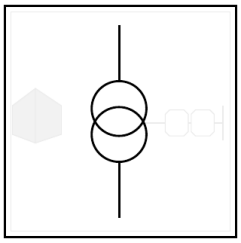
(b)



(c)



(d)



Q17. What is the correct order of the atomic sizes of the elements O, S and Se?

(a) Se > S > O
(b) O > S > Se
(c) S > O > Se
(d) Se > O > S

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Q18. The Rig Veda contains _____ hymns.

(a) 1,014
(b) 1,028
(c) 1,035
(d) 1,020

Q19. X%Y means 'X is the daughter of Y'
X@Y means 'X is the wife of Y'
X$Y means 'X is the brother of Y'
X&Y means 'X is the father of Y'
Based on the above information, find out which of the following expressions indicates that K is the father-in-law of H

(a) H@P$J&L%K
(b) H@J$L%P&K
(c) H@J$L%K&P
(d) H@J$P&L%K

Q20. Under which tree did Queen Mayadevi give birth to Gautam Buddha?

(a) Ashoka tree
(b) Peepal tree
(c) Mango tree
(d) Sal tree

Q21. Which of the following does NOT belong to this group?
A. Teacher
B. Pencil
C. Eraser
D. Sharpener

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

Q22. Find the energy possessed by an object of mass 13 kg when it is at a height of 5 m above the ground. Given g = 9.8 ms^(-2)

(a) 539 J
(b) 588 J
(c) 528 J
(d) 637 J

Q23. Solve for x; x€N: $(x - 4)^2 - 36 = 0$

(a) 2
(b) -10
(c) 10
(d) -2

Q24. Who has moved to the No.1 spot in the ICC ODI Women's Cricket ranking, 2017?

(a) Harmanpreet Kaur
(b) Ekta Bisht
(c) Jhulan Goswami
(d) Mithali Raj

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Q25. If 1332/145 = 9.19, then what the value of 133.2/9.19?

(a) 12.5
(b) 12.00
(c) 14.00
(d) 14.5

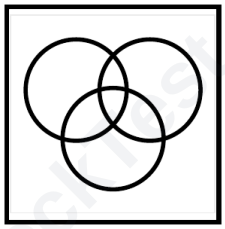
Q26. Who played the lead actor role in the recently released movie 'Parmanu'?

(a) Varun Dhawan
(b) Ranveer Singh
(c) John Abraham
(d) Akshay kumar

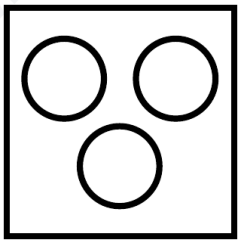
Q27. Choose the best suitable Venn diagram for the following words:

Indoor Games, Chess, Carroms

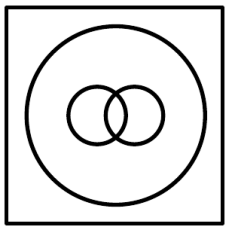
(a)



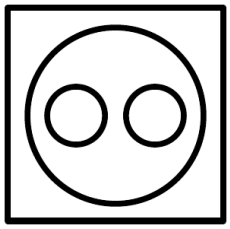
(b)



(c)



(d)



Q28. Identify Aravind Adiga's 2017 book about a young cricket-playing 14-year-old who lives in the Mumbai slums.

(a) 'The White Tiger'
(b) 'Last Man In Tower'
(c) 'Midnight's Children'
(d) 'Selection Day'

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Q29. In a test, (+5) marks are given for every correct answer and (-2) marks are given for every incorrect answer. Rakesh answered all the questions and scored 30 marks though he got 10 correct answers. How many incorrect answers had he attempted?

(a) -10
(b) -12
(c) 10
(d) 12

Q30. How many times between 2 o'clock and 3 o'clock, the hands of the clock are exactly opposite to each other?

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

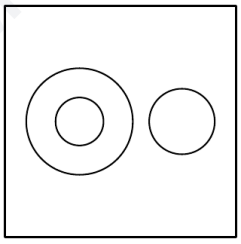
Q31. If Shaam sells 2.5 kg of his homemade jam for Rs. 78.60, what is the cost of 5.5 kg of the jam? (in Rs.)

(a) Rs. 171.92
(b) Rs. 172.92
(c) Rs. 173.92
(d) Rs. 174.92

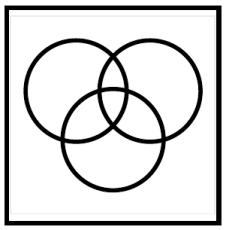
Q32. Choose the best suitable Venn diagram for the following words:

"Tiger, Buffalo, Animals"

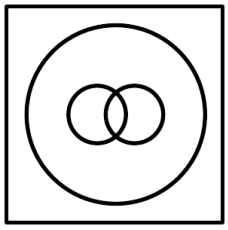
(a)



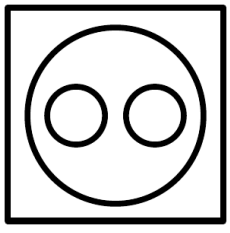
(b)



(c)

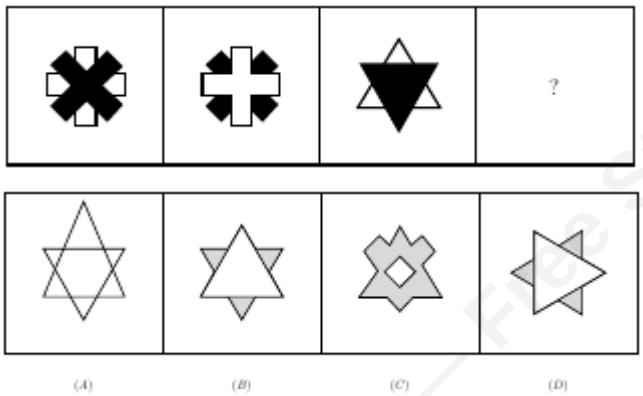


(d)



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Q33.



Select the correct figure that replaces the (?) symbol above from the given options:

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

Q34. A jeweller makes a gold pendant. He uses 50 g of copper for making the piece. If the price for 1 kg of copper is Rs. 420, what is the cost of copper used in the jewellery?

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

Q35. What is the value of the gas constant R?

(a) 8.33 JK^(-1)mol^(-1)
(b) 8.35 JK^(-1)mol^(-1)
(c) 8.31 JK^(-1) mol^(-1)
(d) 8.32 JK^(-1) mol^(-1)

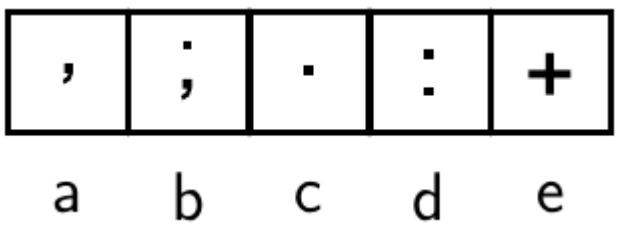
Q36. The salaries of Charan and Rajat are in the ratio of 5: 4. If the salary of each increases by Rs. 3,000, then the new ratio becomes 6: 5. What is Charan's initial salary?

(a) Rs. 18,000
(b) Rs. 15,000
(c) Rs. 20,000
(d) Rs. 12,000

Q37. If a carriage of 910 kg, for 70 km. cost Rs. 45, what will be the cost of a carriage of 940 kg for a distance of 63 km at half the former rate?

(a) Rs. 20.91
(b) Rs. 21
(c) Rs. 55
(d) Rs. 12.56

Q38. Choose the figure that is different from the rest.

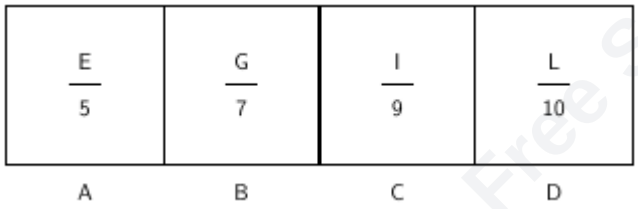


(a) a

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

Q39. Find the odd one out.



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

Q40. A smuggler Veerappan is spotted by a policeman from a distance of 200 meters. When the policeman starts the chase, Veerappan also starts running. Assuming the speed of smuggler is 10 km/hr and that of the policeman 12 km/hr, how far will the smuggler have to run before he is overtaken?

(a) 2 km
(b) 5 km
(c) 10 km
(d) 1 km

Q41. If (a - 1/a) = 6, then (a^4 + 1/(a^4)) = ?

(a) 1444
(b) 34
(c) 38
(d) 1442

Q42. Which Tamil folk singer, composer and renowned exponent of Tamil folk art has been awarded a Padma Shri?

(a) Anitha Kuppusamy
(b) Vijayalakshmi Navaneethakrishnan
(c) LR Eswari
(d) Paravai Muniyamma

Q43. When a cork and a nail are kept in a beaker filled with water, the cork floats while the nail sinks. What is the reason behind this?

(a) The mass of the cork is more than the mass of the iron nail.
(b) The density of the iron nail is more than the density of water
(c) The mass of the iron nail is more than the mass of the cork.
(d) The density of the cork is more than the density of water.

Q44. 189/135 when written in the simplest form is:

(a) 14/10
(b) 28/20
(c) 91/65
(d) 7/5

Q45. Which of the following awards is conferred on Indian sportspersons for their lifetime contribution to sports?

(a) Dronacharya Award
(b) Sardar Award
(c) Dhyan Chand Award
(d) Indira Gandhi Award

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Q46. Find the height (in metres) of the building if the sun's shadow increases by 10 m when the angle of elevation of the sun decreases from 60° to 45°.

(a) 10√3/(√3 + 1)
(b) 10/(√3 - 1)
(c) 10√3
(d) 10√3/(√3 - 1)

Q47. Who among the following won the Best Male Playback Singer Award at the Filmfare Awards 2018?

(a) Ankit Tiwari
(b) Armaan Malik
(c) Arijit Singh
(d) Atif Aslam

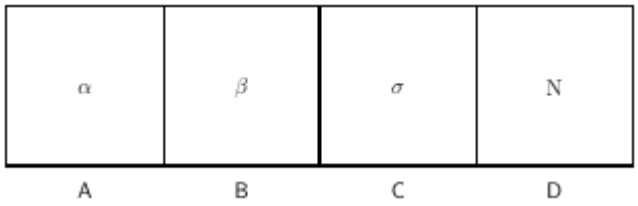
Q48. In 2017, who was the Indian athlete from India to win a gold medal in the Weightlifting World Championships, for the first time in more than two decades?

(a) Kunjarani Devi
(b) Saikom Mirabai Chanu
(c) Soniya Chanu
(d) D. Kavita Devi

Q49. If the pH value of a salt is 14, then it is a salt of _____

(a) strong acid and strong base
(b) weak acid and weak base
(c) weak acid and strong base
(d) strong acid and weak base

Q50. Find the odd one out:



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

Q51. What are the constituents of bronze?

(a) Al + Cu + Mn + Mg
(b) Cu + Zn
(c) Cu + Sn
(d) Pb + Sn

Q52. Who is the Vice Chairman of NITI Aayog as of July 2018?

(a) Rajiv Kumar
(b) Rajeev Mehrishi
(c) Amitabh Kant
(d) Arvind Subramanian

Q53. A water tank is 5 m long, 3 m broad and 1 m deep. How many litres of water can it hold?

(a) 810 L
(b) 720 L
(c) 15,000 L
(d) 729 L

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Q54. Supriya is playing chess with Pallavi. If Supriya is facing North direction, in which direction Pallavi is facing considering the standard chess seating position?

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

Q55. In CO2, C and O2 are present in the ratio _____ by mass

(a) 1 : 8
(b) 8 : 1
(c) 8 : 3
(d) 3 : 8

Q56. An electric iron of 1250 W is used for 3 h per day. The energy consumed in one day by the electric iron is _____ units.

(a) .375
(b) 37.5
(c) 3.75
(d) 375

Q57. A is three years older than B and the age of C is twice that of B. What is the age of A, if the sum of the ages of A, B and C is 35?

(a) 9 years
(b) 10 years
(c) 11 years
(d) 12 years

Q58. _____ are comparatively poor conductors of heat.

(a) Cu and Al
(b) Cu and Fe
(c) Au and Ag
(d) Pb and Hg

Q59. Whom did Ram Nath Kovind defeat to become the 14^(th) President of India?

(a) Pranab Kumar Mukherjee
(b) Meira Kumar
(c) Hamid Ansari
(d) Pratibha Patil

Q60. The C.P of 18 apples is same as the S.P. of 16. Find the gain %

(a) 12.5%
(b) 11%
(c) 12%
(d) 11.5%

Q61. If POLAND can be written as 1615121144, how can SPAIN be written?

(a) 16191425
(b) 19161914
(c) 16191419
(d) 19202516

Q62. The 2018 ICC Under-19 Cricket World Cup was held in:

(a) England
(b) South Africa
(c) Australia

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(d) New Zealand

Q63. Which of the following equations represents the velocity – time relation?

(a) $v = u - at$
(b) $s = ut + ½ at^2$
(c) $2as = v^2 – u^2$
(d) $v = u + at$

Q64. 1 Coulomb/1s = _____

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

Q65. Legendary Indian Architect Balkrishna Doshi recently won a prestigious global award which is sometimes referred to as the Nobel Equivalent in Architecture. Name the award that Shree Doshi won.

(a) Pritzker Award
(b) Bookman Award
(c) Pulitzer Prize
(d) Emma Award

Q66. Rabi had Rs. 713.39 in his bank account. He deposited Rs. 450.75 in his bank account and withdrew the money to pay for five shirts. If the remaining balance of his account is Rs. 545.19, then what is the price of each shirt?

(a) Rs. 125.50
(b) Rs. 113.75
(c) Rs. 123.79
(d) Rs. 120.79

Q67. 3 R # 2 A $ K 5 % T 7 & N Y + X B / L Q @ 1

If the second half of the above series is reversed then using the new series find the terms that does not belong to the group

251, $TQ, K71, A%@

(a) A%@
(b) K71
(c) $TQ
(d) 251

Q68. Srividhya is mother of Vinay. How is Vinay’s only sister’s father related to Srividhya?

(a) Husband
(b) Uncle
(c) Son
(d) Brother

Q69. Anish is thrice as old as his son and the sum of their ages is 48 years.

Find Anish’s age

(a) 12
(b) 36
(c) 40
(d) 20

Q70. Read the statement and identify the logically correct conclusion from the given information.

Statement: The tourism spots should be given extra security.

Conclusions:

I. Terrorists always target destruction at a larger scale.

II. One cannot prevent terrorism act.

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

Q71. How is Pallavi related to her mother's only brother's mother?
(a) Cousin
(b) Sister
(c) Grand daughter
(d) Aunt

Q72. Pollen grains are produced by _____
(a) filament
(b) stigma
(c) anther
(d) ovary

Q73. Manat the currency of which country?
(a) Azerbaijan
(b) Armenia
(c) Albania
(d) Andorra

Q74. The number of chromosomes in a human female germ cell is: _____ pairs.
(a) 24
(b) 46
(c) 23
(d) 48

Q75. A sound wave travels at a speed of 340 ms^(-1). If its wavelength is 2 cm, what is the frequency of the wave?
(a) 170 Hz
(b) 17000 Hz
(c) 1700 Hz
(d) 170000 Hz

Q76. Magnesium ribbon burns with a dazzling _____ flame.
(a) blue
(b) white
(c) green
(d) red

Q77. Given below is a statement followed by two assumptions numbered I and II. You have to consider the statement and the following assumptions and decide which of the assumptions is implicit in the statement.

Statement: The healthiest cooking oil for the whole family an advertisement states.

Assumptions:

I. There are other cooking oils available in the Market.

II. The health of the family is the priority for any individual.

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

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Q78. Read the given question and decide which of the following statements is/are sufficient to answer the question.

What is the total number of balls in the bag?

Statements:

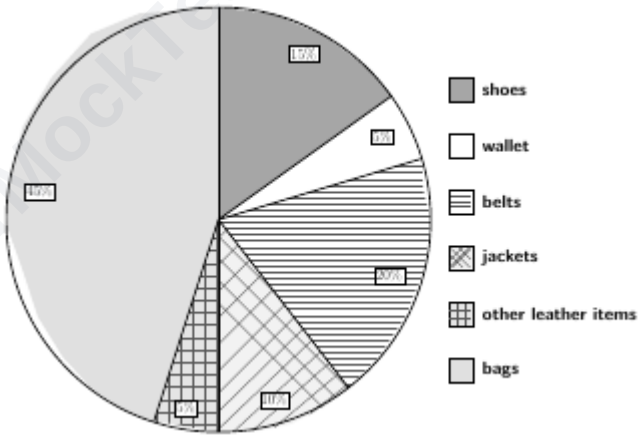
1. The bag contains 6 blue, 7 red and 8 orange balls.
2. The bag is green colour.

(a) Either 1 or 2 is sufficient
(b) Only 1 is sufficient
(c) Only 2 is sufficient
(d) Neither 1 nor 2 is sufficient.

Q79. Mammals have _____.

(a) glandular skin with hairs
(b) dry and non-glandular skin with feathers
(c) dry and non-glandular skin with scales
(d) dry and glandular skin with feathers

Q80. The following pie diagram shows the revenue of the company ABC, which manufactures the leather products. The total revenue of the company for the year 2015 is Rs. 36, 28,000.



How much revenue was made with the sale of Jackets (in Rs) in the year 2015?

(a) Rs. 7,25,600
(b) Rs. 181,400
(c) Rs. 3,62,800
(d) Rs. 90,700

Q81. When was the Goods and Services Tax (GST) introduced in India?

(a) 1^(st) June 2017
(b) 1^(st) August 2017
(c) 1^(st) July 2017
(d) 1^(st) September 2017

Q82. What comes next in the given series

3W, 7V, 11U, 15T, _____

(a) 19 Z
(b) 20 P
(c) 19 S
(d) 22 Q

Q83. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(s) from the statement(s).

Statement:

“From next month onwards, expecting mothers and ladies with kids less than 5 years old would get flexible work

hours," said the CEO of a multinational company.

Conclusions:

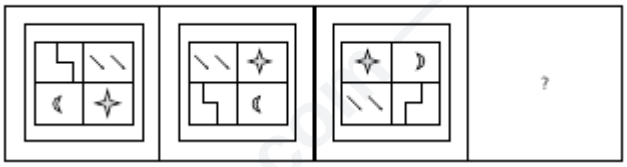
I. Young mothers need to spend more time with their kids in the initial years.

II. The company cares for their female employees' obligation and work pressure

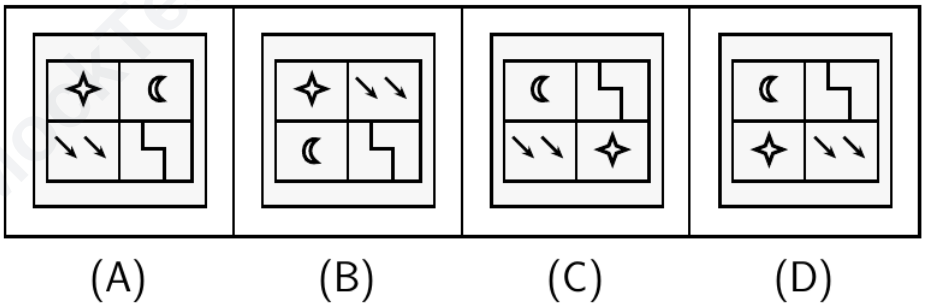
(a) No conclusion follows
(b) Only conclusion II follows
(c) Both the conclusions follow
(d) Only conclusion I follows

Q84. Select the option figure that will complete the series of question figures.

Question Figures



Option Figures



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

Q85. In a village Under Mission Kakatiya, 38 men working 6 hours a day can do a piece of work in 12 days. Find the number of days in which 57 men working 8 hours a day can do the same work. Assume that 2 men of the first group do as much work in 1 hour as 3 men of the second group do in 11/2 hours

(a) 13.5 days
(b) 12 days
(c) 16 days
(d) 14 days

Q86. _____ made the first observations on platinum as a catalyst.

(a) Moseley
(b) Mendeleev
(c) Dobereiner
(d) Newlands

Q87. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(s) from the statement(s).

Statements:

I. All mugs are brown.

II. Some brown are earth.

Conclusions:

1. Some earth are brown.

2. No mugs are earth.

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

Q88. Which of the following is NOT correct for cerebellum?
(a) It lies in the posterior region of the brain
(b) It controls movements, speech, sight, smell, taste, hearing, intelligence etc.
(c) It is a part of hind brain
(d) It maintains equilibrium of the body

Q89. Where does the center of gravity of any freely suspended object lie?
(a) Directly beneath the point of suspension
(b) Immediately below the centre of the object
(c) On the ground
(d) At the centre of the object

Q90. R is the son of Y. Y is the wife of K. K is the only son of Z. Z's wife passed away few years back. Z is the _____ of R.
(a) Maternal grandfather
(b) Paternal grandfather
(c) Grandson
(d) Father

Q91. Under whose reign was National Emergency imposed in India?
(a) I.K. Gujral
(b) A.B. Vajpayee
(c) P.V. Narasimha Rao
(d) Indira Gandhi

Q92. The fifth edition of the South Asia Region Public Procurement Conference was held in:
(a) Chennai
(b) Mumbai
(c) Trivandrum
(d) New Delhi

Q93. What type of tissue makes up the husk of coconut?
(a) Collenchymas
(b) Parenchyma
(c) Phloem parenchyma
(d) Sclerenchymatous fibres

Q94. Find the next(?) number in the series.
9, 12, 16, 21, ?, 34.
(a) 30
(b) 27
(c) 28
(d) 35

Q95. From a class, one-fourth opted to learn German; two-fifths of the remaining students chose Italian. Two-thirds of the remaining students decided to learn French and the rest Japanese. If 72 people decided to learn Japanese, how many of them opted for Italian?
(a) 180
(b) 132
(c) 120

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(d) 144

Q96. The ratio of the measures of each interior angle of a regular octagon to that of the regular dodecagon is:

(a) 8 : 12
(b) 9 : 10
(c) 12 : 8
(d) 4 : 5

Q97. The area of the triangle with vertices at (a, b + c), (b, c + a) and (c, a + b) is

(a) 0
(b) a – b - c
(c) ab + bc + ca
(d) a + b + c

Q98. Which of the following fractions is the largest?

1/8,2/12,3/16,4/20

(a) 1/8
(b) 3/16
(c) 4/20
(d) 2/12

Q99. If one of the acute angles of the right-angled triangle is 55°, what is the measure of the other acute angle?

(a) 40°
(b) 30°
(c) 25°
(d) 35°

Q100. 6 skilled workers can dig a pond in 8 days while it takes 9 unskilled workers 12 days to dig it. How many days will it take 4 skilled and 18 unskilled workers to dig such a pond?

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

ANSWER KEY

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

SOLUTIONS

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Q1. Answer: (d) Electric fan

The correct answer is Electric Fan.

In electric fan Electric energy is converted into mechanical energy.

Important Points

• Conversion of energy is the process of changing energy from one form to another.

• Energy is the capacity to do work. its S.I. unit is Joule.

• In the Iron box, Electrical energy is used and it is transformed into Heat energy.

• In the Television, Electrical energy is converted into light.

• In Torch, the chemical energy stored in batteries is converted into electrical energy, then transformed into heat and light energy.

Q2. Answer: (a) Vijaya Bank

The correct answer is Vijaya Bank.

Key Points

• Murali Ramaswami joined Vijaya Bank as the Executive Director from 19th February 2018.

• J Packirisamy is the Managing Director and CEO of Andhara Bank.

• Ashwani Bhatia as the new Managing Director and CEO of State Bank of India. India's largest Public Sector lender is State Bank of India.

• Malvika Sinha has appointed as Executive Director of Reserve of Bank of India. It is also called as' Bank of Banks'.

Q3. Answer: (d) Rs. 1,951

Shortcut Trick

For half-yearly compounding, the rate becomes 4% (8 ÷ 2) and the time periods become 3 (1.5 years × 2).

Using the Ratio Method for 3 periods (3 : 3 : 1):

4% of 15,625 = 625; 4% of 625 = 25; 4% of 25 = 1.

Compound Interest = (3 × 625) + (3 × 25) + (1 × 1) = 1875 + 75 + 1 = 1951.

Therefore The correct answer is Rs. 1,951.

Alternate Method

Given:

Principal (P) = Rs. 15,625

Rate (R) = 8% per annum (compounded half-yearly)

Time (n) = 1 year 6 months = 1.5 years

Formula Used:

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

Compound Interest (CI) = Amount − Principal

Calculations:

=> Effective rate (r) = 8% ÷ 2 = 4% per half-year

=> Number of periods (n) = 1.5 × 2 = 3 half-years

=> Amount = $15625 \times (1 + 4/100)^3$

=> Amount = $15625 \times (26/25) \times (26/25) \times (26/25)$

=> Amount = $15625 \times (17576 / 15625)$

=> Amount = Rs. 17,576

=> CI = 17576 − 15625

=> CI = Rs. 1,951

Therefore The correct answer is Rs. 1,951.

Additional Information

Half-Yearly Compounding Rule

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

Quarterly Compounding Rule

When interest is compounded quarterly, the annual rate is divided by 4 and the time in years is multiplied by 4.

CI vs SI Difference (for 2 years)

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

Q4. Answer: (d) New Delhi

The correct answer is New Delhi.

Important Points

• National War Memorial Delhi is spread across 40 acres in New Delhi.

• New Delhi Prime Minister Narendra Modi dedicated a new National War Memorial situated in the India gate complex, in New Delhi.

• It is built to Honour the Indian Armed Forces and is built around the existing canopy near India Gate.

• The memorial wall is flushed with the ground and in harmony with existing aesthetics.

• The names of armed forces personnel martyred during the armed conflicts of Indo-Pakistani War of 1947, 1961 War in Goa, Sino-Indian War, Indo-Pakistani War of 1965, Indo-Pakistani War of 1971, 1987 (Siachen), 1987-88 (Sri Lanka), 1999 (Kargil), and other operations such as Operation Rakshak, are inscribed on the memorial walls

Q5. Answer: (c) 12.17 gms

Shortcut Trick

Density of metal = Total Weight ÷ Total Volume = 207 ÷ 136 g/cm³.

Side of the exact cube formed from the sheet thickness (h) = 136 ÷ (2 × 2) = 34 cm (Not feasible for a cube from 2cm sheet).

Weight of 1 cm³ = 207 ÷ 136 ≈ 1.522 gms.

If the cube side is based on the sheet thickness h = Volume ÷ Area = 136 ÷ 4 = 34 cm, the calculation for a small unit cube weight is needed.

Weight of 2×2×2 cube = 8 × (207 ÷ 136) = 12.176 gms.

Therefore The correct answer is 12.17 gms.

Alternate Method

Given: Volume of metal = 136 cm³, Weight = 207 gms. Dimensions of sheet base = 2 cm × 2 cm.

Formula Used: Weight = Density × Volume; Volume of cube = a^3; Thickness of sheet (h) = Volume ÷ Area.

=> Density of the metal = 207 ÷ 136 = 1.52205 g/cm³

=> The sheet is hammered into a square sheet of 2 cm long. Area of base = 2 × 2 = 4 cm^2

=> An exact cube that can be cut out from a 2 cm wide sheet has a side (a) = 2 cm

=> Volume of the cube = $a^3 = 2^3$ = 8 cm^3

=> Weight of the cube = Volume × Density = 8 × (207 ÷ 136)

=> Weight = (8 × 207) ÷ 136 = 1656 ÷ 136 = 12.1764 gms

Therefore The correct answer is 12.17 gms.

Additional Information

Density and Weight Relationship

Density is the mass per unit volume (D = M/V). For the same material, the weight of any shape is directly proportional to its volume.

Volume of Solids

Volume of a Cube = a^3 and Volume of a Cuboid (Sheet) = length × width × height (thickness).

Unit Conversions

1 cm^3 of water weighs 1 gm at standard temperature. For metals, density is usually > 1 g/cm^3.

Q6. Answer: (d) 5 C

The correct answer is 5 Coulomb.

Key Points

• Work is done when a force is applied on a body and makes a body move i.e. when the body displaces from its position by the act of force.

• For example- Pushing a car horizontally from a rest, Walking upstairs, Shooting a Bullet, etc. Its S.I. Unit is Joule (J).

• Potential Difference is the amount of work done by the positive test charge from one point to another point.

• For example- the movement of free electrons in a metallic conductor. Its S.I. Unit is Volt (V).

• Electric charge is the physical property of matter that causes it to experience a force when placed in an electromagnetic field.

• They are of two types: positive and negative. Its S.I. unit is Coulomb (C).

Concept

Work done = Potential Difference × Charge.

Calculation:

• Work- 60 J,
• Potential difference- 12 V,
• Charge-?
By Formula,
• Work = potential difference × charge
• Charge = work / potential difference
• Charge = 60 J / 12 V
• Charge = 5 Coulomb.

Q7. Answer: (d) Both are true

The correct answer is Both are True.
Key Points
• The gases can be converted into liquids by bringing its particles closer, so atmospheric gases can be liquefied either by decreasing temperature or by increasing pressure. Hence, statement 1 is correct.
• On a hot dry day, the temperature is high and humidity is less which helps in better evaporation.
• Due to the higher rate of evaporation, it gives better cooling effect. Hence, statement 2 is correct.
• That is why a desert cooler cools better on a hot dry day.
Important Points
• Humidity tells you the moisture content of the atmosphere, or how much water vapor there is in the air.
• When the humidity is high it feels oppressive outside because sweat doesn't evaporate and provide cooling.
• When the humidity is low, you feel cooler but your skin dries out and you get dehydrated more easily because more moisture is being evaporated from your body.
Additional Information
• Desert Cooler -
• In a desert cooler, the water inside it is made to evaporate.
• This leads to the absorption of energy from the surroundings, thereby cooling the surroundings.
• Evaporation depends on the amount of water vapour present in the air (humidity).
• If the amount of water vapour present in the air is less, then evaporation is more.
• On a hot dry day, the amount of water vapour present in the air is less.
• Thus, water present inside the desert cooler evaporates more, thereby cooling the surroundings more.

Q8. Answer: (c) 28

The count of the smallest triangular unit’s presents in the following figure is shown below:
Hence, ‘28’ is the correct answer.

Q9. Answer: (a) 10

Given:
From the given bar graph we can say that,
Ranks scored from ABC in 2012 = 30
Ranks scored from ABC in 2013 = 50
Ranks scored from ABC in 2014 = 10
Ranks scored from ABC in 2015 = 80
Ranks scored from ABC in 2016 = 50
Therefore Ranks scored from ABC in 2014 = 10

Q10. Answer: (a) Only A is true

The correct answer is Only A is true.
Important Points
• Sound is a longitudinal Mechanical Wave.
• Sound can travel through any medium, but it cannot travel through a vacuum.
• The speed of sound depends upon the type of medium and its state.
• It is generally affected by two things: 1. Elasticity 2.Inertia.
• The speed of sound in aluminium is 6420 m/s.

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• The speed of sound in Nickel is 6040 m/s.

Additional Information

Speed of sound in different media at 25 ºC		
State	Medium	Speed of sound (m/s)
Solid	Solids Aluminium	6420
Nickel	6040	
Steel	5960	
Iron	5950	
Brass	4700	
Glass (Flint)	3980	
liquid	Liquids Water (Sea)	1531
Water (distilled)	1498	
Ethanol 1207	1207	
Methanol	1103	
gas	Gases Hydrogen	1284
Helium	965	
Air	346	
Oxygen	316	
Sulfur dioxide	213	

https://ncert.nic.in/ncerts/l/iesc112.pdf

Q11. Answer: (b) C

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

Hence, ‘option 2’ is the correct answer.

Q12. Answer: (d) Weight of body

The correct answer is the Weight of a body.

Important Points

• The electromagnetic force is a type of physical interaction that occurs between electrically charged particles. It acts between charged particles and a combination of all-electric and magnetic forces. It can be repulsive or attractive.

• The electromagnetic nature is to interact without coming into contact. friction is the electromagnetic force between atoms that may not actually touch.

• The weight of a body is not electromagnetic in nature. The weight of the body is the Gravitational force acting on it and this force depends on the acceleration due to gravity.

• Tension force is the force that is transmitted through a cable, rope, wire, or string when it is pulled tight by forces acting from opposite ends.

• The electrical force in spring is due to the flow of electrons at both ends to maintain equilibrium.

Q13. Answer: (a) Mount Kanchenjunga

• Mount Kanchenjunga is the highest peak of India.

• It has an elevation of 28,169 feet (8,586 metres).

• It lies on the border of Nepal and the state of Sikkim and is the world’s third tallest peak.

• The mountain and its glaciers receive heavy snow during the summer monsoon season and a lighter snowfall during the winter.

• The name “Kanchenjunga” is derived from the Tibetan word 'Kanchen' and 'Dzonga' translating to "The Five Treasures of the Great Snows", owing to the five significant mountains in the region.

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Q14. Answer: (c) Only assumption I is implicit

(Implicit - suggested though not directly expressed)

I. An initiative has to be taken to move further. – True (As, “The journey of a thousand miles starts with the first step” implies to take the first step to move further)

II. People stop themselves from starting something with, due to financial concerns. – False (As, “The journey of a thousand miles starts with the first step” it implies only about starting a journey)

Hence, only assumption I is implicit.

Q15. Answer: (c) 6.990

Given:

x = 4.51

y = 2.48

According to question:

x + y = (4.51 + 2.48) = 6.99

Therefore Upper bound of x + y is 6.99

Q16. Answer: (a) [figure]

In all the options except ‘1’, the two circles are intersecting with each other and some of the region is not common, while in option 1, the small circle is entirely within the larger one, such that there is no uncommon region left.

Hence, ‘option 1’ is the odd one out.

Q17. Answer: (a) Se > S > O

The correct answer is Se>S>O.

Key Points

• Atomic size is the distance from the nucleus to the valence shell where the valence electrons are located.

• The size of an atom i.e. no. of electrons present in the valence shell or no. of valence shell.

Important Points

• Se -

• Atomic number = 34,

• Mass no.= 78.96

• Electronic configuration = 2,8,18,6,

• It contains 4 shells.

• S -

• Atomic number = 16,

• Mass no. = 32,

• Electronic configuration = 2,8,6,

• It contains 3 shells.

• O -

• Atomic number = 8,

• Mass no. = 16,

• Electronic configuration = 2.6,

• It contains 2 shells.

Q18. Answer: (b) 1,028

The correct answer is 1,028.

Key Points

• The Rigveda contains 1028 hymns.

• Rigvedic people, who called themselves Aryans, were confined in the area which came to be known as Sapta Sindhu.

• According to the Rigveda, the most mentioned river- Sindhu, the most pious river- Saraswati, mention of the Ganges one time, mention of Yamuna three times.

• A Rigvedic society comprised four Varnas, namely Brahmana, Kshatriya, Vaisya, and Shudra.

• The nature of Rigvedic religion was Henotheism i.e. a belief in many gods but each god standing out in turns as the highest.

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Q19. Answer: (c) H@J$L%K&P

X is				
Symbol	%	@	$	&
Meaning	Daughter	Wife	Brother	Father
to Y				

1) H@P$J&L%K → H is the wife of P, P is the brother of J, J is the father of L, L is the daughter of K.
K is the sister-in-law of H.
2) H@J$L%P&K → H is the wife of J, J is the brother of L, L is the daughter of P, P is the father of K.
K is the sister-in-law/brother-in-law of H.
3) H@J$L%K&P → H is the wife of J, J is the brother of L, L is the daughter of K, K is the father of P.
K is the father-in-law of H.
4) H@J$P&L%K → H is the wife of J, J is the brother of P, P is the father of L, L is the daughter of K.
K is the sister-in-law of H.
Hence, 'H@J$L%K&P' indicates that K is the father-in-law of H.

Q20. Answer: (d) Sal tree

The correct answer is Sal tree.
Additional Information
• Mayadevi married king Suddhodana, the ruler of the Sakya clan of Kapilvastu.
• She was the daughter of king Suddhodhana's uncle and her father was king of Devadaha.
• Queen Maya Devi of Sakya was the birth mother of Gautam Buddha, the sage on whose teachings Buddhism was founded.
• She was the sister of Mahaprajapati gotami, the first Buddhist run ordained by the Buddha.
• Under Sal tree, Queen Mayadevi give birth to Gautam Buddha.

Q21. Answer: (d) A

Pencil, Eraser and Sharpener are stationery items.
While the teacher is a person who teaches in a school.
Hence, 'teacher' is the odd one out.

Q22. Answer: (d) 637 J

The correct answer is 637 J.
Important Points
• Kinetic energy is the energy possessed by an object when it is in motion. Its S.I. unit is Joule.
K.E. = 1/2 mv^2.
• To calculate the energy possessed by an object, we need to use the Equation of motion i.e. $v^2 = u^2+2gh$.
• K.E= Kinetic energy, m = mass, v = final velocity, u = initial velocity, g = gravitational acceleration, h = height.
CALCULATION:-
• By equation of motion,
• $v^2 = u^2 + 2gh$ (u = 0 m/s)
• $v^2 = 0 + 2\times9.8\times5$
• $v^2 = 98$ m/s.
• The kinetic energy of object = 1/2 mv^2,
• K.E. = 1/2 × 13 × 98 J
• K.E. = 13×49 J
• K.E. = 637 J.

Q23. Answer: (c) 10

Shortcut Trick
$(x - 4)^2 = 36$
Taking square root on both sides: $x - 4 = \pm6$
$x = 4 + 6 = 10$ OR $x = 4 - 6 = -2$

Since x in N (Natural Numbers), x must be 10.

Therefore The correct answer is 10.

Alternate Method

Given: $(x - 4)^2 - 36 = 0$ where x in N

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

=> $(x - 4)^2 - 6^2 = 0$

=> $((x - 4) - 6)((x - 4) + 6) = 0$

=> $(x - 10)(x + 2) = 0$

=> $x - 10 = 0$ or $x + 2 = 0$

=> $x = 10$ or $x = -2$

=> As x is a natural number, x cannot be −2.

=> $x = 10$

Therefore The correct answer is 10.

Additional Information

Natural Numbers (N)

The set of positive integers starting from 1, 2, 3, ... (excluding zero and negative values).

Quadratic Roots

A quadratic equation of degree 2 always has two roots, which may be real, equal, or imaginary.

Difference of Squares

Any expression of form $a^2 - b^2$ can be factored into $(a + b)(a - b)$.

Q24. Answer: (d) Mithali Raj

The correct answer is Mithali Raj.

Key Points

• Mithali Dorai Raj is an Indian Cricketer and the Captain of the Indian Women's National Cricket team. She is often regarded as India's greatest batswoman.

• Mithali Raj has moved up one place to occupy the number one spot in the ICC ODI rankings 2017.

Additional Information

• Harmanpreet Kaur is an Indian Cricketer. She plays as an All-rounder for the Indian Women's Cricket team and was awarded the Prestigious Arjuna award for cricket in the year 2017 by the Ministry of youth affairs and sports.

• Jhulan Nishit Goswami is an Indian International Cricketer and the former Captain of the India National women's Cricket team. She awarded the Arjuna award for cricket and Padma Shri.

• Ekta Bisht is an Indian cricket player. She is a left-handed batswoman and slow left-arm orthodox bowler. She was the first International woman cricketer from the Uttrakhand state of India. She was also the first Cricketer for India to take Hat-trick in a women's Twenty-20 International match.

Q25. Answer: (d) 14.5

Calculation:

Considering the given statement

=> 1332/145 = 9.19

Now,

Dividing the numerator and denominator by 10 we get

=> 133.2/14.5 = 9.19

=> 133.2/9.19 = 14.5

Therefore Required value is 14.5

Q26. Answer: (c) John Abraham

The correct answer is John Abraham.

Key Points

• The film is based on the Nuclear bomb test explosions conducted by the Indian army at Pokhran in 1998.

• It stars John Abraham, Diana Penty and Boman Irani in lead roles.

• It is a 2018 Indian Hindi-language historical action drama film directed by Abhishek Sharma and jointly written by Saiwyn Quadras, Sanyuktha Chawla Sheikh and Sharma.

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Q27. Answer: (d) [figure]

The best suitable Venn diagram for 'Indoor Games, Chess, Carroms is shown below:

Both Chess and Carrom are Indoor games.

Hence, 'option 4' is the correct answer.

Q28. Answer: (d) 'Selection Day'

The correct answer is Selection day.

Key Points

• Selection Day is a 2016 sports fiction novel written by Booker Prize winner Aravind Adiga.

• It was shortlisted along with four other writers for the 2017 DSC Prize for South Asian Literature.

• It tells the story of Mohan Kumar, a chutney seller who trains his two sons, Manju Kumar and Radha Krishna for Mumbai's under-19 cricket team.

• Aravind Adiga is an Indo-Australian writer and journalist.

Additional Information

• 'The White Tiger' is the debut novel by Indian author Aravind Adiga.

• It was first published in 2008 and won the 40th Man Booker Prize in the same year.

• 'Last Man In Tower' is a 2011 novel by Indian Writer Aravind Adiga.

• It tells the story of a struggle for a slice of shining Mumbai real Estate.

• 'Midnight Children ' is a 1981 novel by author Salman Rushdie.

• It deals with India's Transition from British colonialism to independence and the partition of India.

Q29. Answer: (c) 10

Shortcut Trick

Total score = (Correct × Marks for correct) + (Incorrect × Marks for incorrect)

30 = (10 × 5) + (Incorrect × (−2))

30 = 50 − 2 × Incorrect

2 × Incorrect = 50 − 30 = 20

Incorrect = 20 ÷ 2 = 10

Therefore The correct answer is 10.

Alternate Method

Given:

Marks for 1 correct answer = +5

Marks for 1 incorrect answer = −2

Total score of Rakesh = 30

Number of correct answers = 10

Calculations:

=> Marks obtained from correct answers = 10 × 5 = 50

=> Let the number of incorrect answers be x.

=> Marks obtained from incorrect answers = x × (−2) = −2x

=> Total marks = (Marks from correct) + (Marks from incorrect)

=> 30 = 50 + (−2x)

=> 30 = 50 − 2x

=> 2x = 50 − 30

=> 2x = 20

=> x = 20 ÷ 2

=> x = 10

Therefore The correct answer is 10.

Additional Information

Negative Marking System

It is used to penalize wrong attempts. Net Score = (Total Correct × Marks/Correct) − (Total Wrong × Penalty/Wrong).

Linear Equations in One Variable

Equations in the form ax + b = c are solved by isolating the variable x through inverse operations.

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Integer Arithmetic

When a positive integer is multiplied by a negative integer, the product is always negative.

Q30. Answer: (b) 1

Time between 2 o'clock and 3 o'clock, is 1 hour, and the hands of a clock are exactly opposite to each other only once in 1 hour.

Hence, option 2) is the correct answer.

Q31. Answer: (b) Rs. 172.92

Shortcut Trick

Ratio of weights = 2.5 : 5.5 = 5 : 11

Since Price is directly proportional to Weight:

5 units = Rs. 78.60

1 unit = 78.60 ÷ 5 = Rs. 15.72

Required Cost = 11 units = 11 × 15.72 = Rs. 172.92

Therefore The correct answer is Rs. 172.92.

Alternate Method

Given:

Weight 1 (W1) = 2.5 kg

Price 1 (P1) = Rs. 78.60

Weight 2 (W2) = 5.5 kg

Formula Used:

Using the Unitary Method: Cost of required quantity = (Price 1 ÷ Weight 1) × Weight 2

Calculations:

=> Price of 1 kg jam = 78.60 ÷ 2.5

=> Price of 1 kg jam = (78.60 × 10) ÷ (2.5 × 10) = 786 ÷ 25

=> Price of 1 kg jam = Rs. 31.44

=> Price of 5.5 kg jam = 31.44 × 5.5

=> Price of 5.5 kg jam = 172.920

=> Price of 5.5 kg jam = Rs. 172.92

Therefore The correct answer is Rs. 172.92.

Additional Information

Unitary Method

A technique for solving problems by first finding the value of a single unit, and then finding the necessary value by multiplying the single unit value.

Direct Proportion

Two quantities are in direct proportion if an increase in one leads to a corresponding increase in the other. Formula: x1/y1 = x2/y2.

Decimal Multiplication Shortcut

When multiplying decimals, ignore the decimal points first, multiply the whole numbers, and then place the decimal point such that the number of decimal places in the product is the sum of the decimal places in the factors.

Q32. Answer: (d) [figure]

The best suitable Venn diagram for "Tiger, Buffalo, Animals" is shown below:

Both Tiger and Buffalo are animals.

Hence, 'option 4' is the correct answer.

Q33. Answer: (a) B

The logic is:

The common shaded portion of both the shape in 1^(st) image in unshaded in the 2^(nd) image.[K1]

Similarly,

The bigger triangle will be unshaded and the three small triangles will be shaded.

Hence, 'option 1' is the correct answer.

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Q34. Answer: (c) Rs. 21

Shortcut Trick

Since 1 kg = 1000 g, and we need to find the cost for 50 g.

Ratio of required weight to total weight = 50 ÷ 1000 = 1/20.

Cost of 50 g = Total Cost ÷ 20

=> 420 ÷ 20 = Rs. 21.

Therefore The correct answer is Rs. 21.

Alternate Method

Given:

Price of 1 kg copper = Rs. 420

Quantity of copper used = 50 g

Formula Used:

Cost = (Price per unit weight) × (Required weight)

Calculations:

=> 1 kg = 1000 g

=> Cost of 1000 g of copper = Rs. 420

=> Cost of 1 g of copper = 420 ÷ 1000

=> Cost of 50 g of copper = (420 ÷ 1000) × 50

=> Cost = 42 ÷ 2

=> Cost = Rs. 21

Therefore The correct answer is Rs. 21.

Additional Information

Unitary Method

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

Mass Conversion

Standard unit conversion: 1 kilogram (kg) = 1000 grams (g). Always ensure units are consistent before calculation.

Price Calculation

Total Cost = Unit Price × Quantity. If the rate is given for a different unit, convert the quantity to match the rate unit.

Q35. Answer: (c) 8.31 JK^(-1) mol^(-1)

The correct answer is 8.31 JK-1 mol-1.

• 'R' Which is the symbol for the Gas constant, Molar gas constant, or Universal gas constant that we use to quantify the relationship between the properties of a gas.

• The Gas Constant is the physical constant in the equation for the Ideal Gas Law.

• PV = nRT Where P is pressure, V is volume, n is No. of moles, and T is temperature.

• The constant R that we typically use relates pressure in atmospheres, volume in litres, and temperature in kelvin.

• In this case, it has the value and units of R = 0.08206 L atm mol-1 K-1.

• The gas constant R is a universal constant that relates energy and temperature.

• R = 8.314 J mol-1 K-1.

Q36. Answer: (b) Rs. 15,000

Shortcut Trick

Initial Ratio of Charan to Rajat = 5 : 4 (Difference = 1 unit)

New Ratio after increase = 6 : 5 (Difference = 1 unit)

Since the difference in ratio parts is the same, 1 unit increase = Rs. 3,000.

Charan's initial salary = 5 units = 5 × Rs. 3,000 = Rs. 15,000.

Therefore The correct answer is Rs. 15,000.

Alternate Method

Given: Initial ratio = 5 : 4, Increase = Rs. 3,000, New ratio = 6 : 5.

=> Let initial salaries be 5x and 4x.

=> (5x + 3000) ÷ (4x + 3000) = 6 ÷ 5

=> 5 × (5x + 3000) = 6 × (4x + 3000)

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=> 25x + 15000 = 24x + 18000

=> 25x − 24x = 18000 − 15000

=> x = 3000

=> Charan's initial salary = 5x = 5 × 3000 = Rs. 15,000.

Therefore The correct answer is Rs. 15,000.

Additional Information

Ratio Balancing Method

If the difference between ratio terms (a:b and c:d) is not same, multiply the ratios by the difference of the other ratio to balance the gap.

Proportion Rule

If a:b = c:d, then product of extremes equals product of means (ad = bc).

Q37. Answer: (a) Rs. 20.91

Shortcut Trick

Apply the Chain Rule: Cost is directly proportional to Weight, Distance, and Rate.

New Cost = Old Cost × (New Weight / Old Weight) × (New Distance / Old Distance) × (New Rate / Old Rate)

New Cost = 45 × (940 / 910) × (63 / 70) × (1 / 2)

New Cost = 45 × (94 / 91) × (9 / 10) × (1 / 2) = 1903.5 ÷ 91 ≈ 20.917

Therefore The correct answer is Rs. 20.91.

Alternate Method

Given:

Initial Weight (W1) = 910 kg, Initial Distance (D1) = 70 km, Initial Cost (C1) = Rs. 45

New Weight (W2) = 940 kg, New Distance (D2) = 63 km, New Rate = 1/2 of former rate

Formula Used: (W1 × D1 × R1) / C1 = (W2 × D2 × R2) / C2

Calculations:

=> Let the initial rate be R. The new rate is R/2.

=> C2 = C1 × (W2/W1) × (D2/D1) × (R2/R1)

=> C2 = 45 × (940 / 910) × (63 / 70) × ((R/2) / R)

=> C2 = 45 × (94 / 91) × (9 / 10) × (1 / 2)

=> C2 = (45 × 94 × 9) / (91 × 10 × 2)

=> C2 = (4.5 × 47 × 9) / 91

=> C2 = 1903.5 / 91

=> C2 ≈ 20.9175...

Therefore The correct answer is Rs. 20.91.

Additional Information

Direct Proportion

When one quantity increases, the other increases in the same ratio. Formula: x1/y1 = x2/y2.

Inverse Proportion

When one quantity increases, the other decreases in the same ratio. Formula: x1y1 = x2y2.

Chain Rule Application

Used for problems involving multiple variables where one is dependent on several independent variables like Weight, Time, or Distance.

Q38. Answer: (b) e

In all the images except ‘e’, the symbols are used in English grammar, while ‘+’ are a sign used in mathematics.

Hence, ‘option 2’ is the odd one out.

Q39. Answer: (c) D

The logic is:

The place values of the letters are:

E = 5; G = 7; I = 9; L = 12, but the number below L is ‘10’ which is not a correct combination of its place value, while the other letters are correctly placed with their place value.

Hence, ‘option 3’ is the odd one out.

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Q40. Answer: (d) 1 km

Shortcut Trick

Ratio of Speeds (Policeman : Smuggler) = 12 : 10 = 6 : 5.

Since Time is constant, Distance ratio = Speed ratio = 6 : 5.

Difference in distance units = 6 − 5 = 1 unit → 200 m.

Distance run by Smuggler = 5 units = 5 × 200 m = 1000 m = 1 km.

Therefore The correct answer is 1 km.

Alternate Method

Given: Initial distance = 200 m = 0.2 km. Speed of Policeman (V_p) = 12 km/hr. Speed of Smuggler (V_s) = 10 km/hr.

Formula Used: Relative Speed = Speed1 − Speed2 (same direction); Distance = Speed × Time.

=> Relative Speed = 12 − 10 = 2 km/hr.

=> Time taken to catch = Initial distance ÷ Relative speed = 0.2 ÷ 2 = 0.1 hr.

=> Distance run by Smuggler = Speed of Smuggler × Time = 10 × 0.1 = 1 km.

Therefore The correct answer is 1 km.

Additional Information

Relative Speed Concept

When two objects move in the same direction, the relative speed is the difference of their individual speeds (u − v).

Proportionality Rule

When time is constant, the distance traveled is directly proportional to the speed (D1/D2 = S1/S2).

Unit Conversion

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

Q41. Answer: (d) 1442

Shortcut Trick

If $a - 1/a = k$, then $a^2 + 1/a^2 = k^2 + 2$.

If $a^2 + 1/a^2 = m$, then $a^4 + 1/a^4 = m^2 - 2$.

Given $k = 6$ => $a^2 + 1/a^2 = 6^2 + 2 = 38$.

Now, $m = 38$ => $a^4 + 1/a^4 = 38^2 - 2 = 1444 - 2 = 1442$.

Therefore The correct answer is 1442.

Alternate Method

Given: $a - 1/a = 6$

Formula Used: $(x - y)^2 = x^2 + y^2 - 2xy$ and $(x + y)^2 = x^2 + y^2 + 2xy$

Step-by-step Calculation:

=> Square the given equation: $(a - 1/a)^2 = 6^2$

=> $a^2 + (1/a)^2 - 2 \times a \times (1/a) = 36$

=> $a^2 + 1/a^2 - 2 = 36$

=> $a^2 + 1/a^2 = 38$

=> Square both sides again: $(a^2 + 1/a^2)^2 = 38^2$

=> $(a^2)^2 + (1/a^2)^2 + 2 \times a^2 \times (1/a^2) = 1444$

=> $a^4 + 1/a^4 + 2 = 1444$

=> $a^4 + 1/a^4 = 1444 - 2 = 1442$

Therefore The correct answer is 1442.

Additional Information

Algebraic Power Relations

If $x + 1/x = k$, then $x^2 + 1/x^2 = k^2 - 2$ and $x^4 + 1/x^4 = (k^2 - 2)^2 - 2$.

Negative Sign Conversion

When converting from $a - 1/a$ to $a^2 + 1/a^2$, the middle term is -2, so it is added to the square of the constant. For even powers higher than 2, the signs depend on the previous step's result.

Common Squares for Speed

Calculating squares like 38^2 can be done as $(40 - 2)^2 = 1600 - 160 + 4 = 1444$.

Q42. Answer: (b) Vijayalakshmi Navaneethakrishnan

The correct answer is Vijayalakshmi Navaneethakrishnan.

Key Points

• Vijayalakshmi Navaneethakrishnan is a Tamil Folk Singer and Composer.

• She is a renowned exponent of Tamil folk art and awarded a Padma Shri.

Important Points

• Anitha Kuppusamy is a Tamil folk and Carnatic Singer and Television host known for her 'Naatupura Pattu', a Tamil folk art.

• L R Eswari is a veteran Playback Singer of Tamil cinema, Telugu Cinema, Malayalam Cinema, and Kannada Cinema Industries. She won the 'Kalaimamani' The Tamil Nadu's state award, for her contributions to the Film Industry.

• Paravai Muniyamma was an Indian Veteran Folk Singer and Actress. She got the adjective Paravai as she was born in a village called Paravai in Madurai. She got the Kalaimamani Award.

Additional Information

• Padma Shri is the Fourth Highest civilian award in the republic of India, after the Bharat Ratna, Padma Vibhushan, Padma Bhushan.

• It is awarded by the Govt. of India every year on India's Republic Day.

Q43. Answer: (b) The density of the iron nail is more than the density of water

The correct answer is The density of the iron nail is more than the density of water.

Key Points

• The density of a substance is defined as the mass per unit volume.

• Its S.I. unit is kg/m^3.

• Density = Mass / Volume.

• An object that is partly, or completely, submerged experiences a greater Pressure on its bottom surface than on its top surface. This causes a resultant force upwards. This force is called upthrust.

• Upthrust = Apparent loss of weight of object = Weight in the air – Weight in liquid.

Hint

• The Density of cork is less than that of water.

• Thus, the upthrust of water on the cork is greater than the weight of the cork. Hence, it Floats.

• On the other hand, The Density of the Iron nail is more than water, and the Upthrust of water on the iron nail is less than that of the weight of the Iron nail. Thus, it sinks.

Q44. Answer: (d) 7/5

=> (189/135)

=> 27 is common in both the numbers

Divide both numbers by 27

=> 7/5

Therefore simplest form of 189/135 is 7/5

Q45. Answer: (c) Dhyan Chand Award

The correct answer is Dhyan Chand Award.

Important Points

The Dhyan Chand Award-

• The Dhyan Chand Award, officially known as Dhyan Chand Award for Lifetime Achievement in Sports and Games is the lifetime achievement sporting honour of India.

• The award is named after Dhyan Chand, an Indian field hockey player who scored more than 1000 goals during a career that spanned over 20 years.

• 5 lac is awarded to the recipient of the Dhyan Chand Award.

• The award was instituted in 2002.

Additional Information

• Dronacharya Award is for outstanding Coaches in Sports and Games, are sports Coaching honour of the Republic of India. The award named after the Drona often called "Guru Drona" or "Dronacharya".

• Sardar Award seeks to recognize the notable and inspiring contribution to promote the cause of National Unity and Integrity and to reinforce the value of a strong and united India.

• Indra Gandhi Award for Peace, Disarmament, and Development is an annual prestigious award named after former Prime

minister Indira Gandhi. It is conferred every year by the Indira Gandhi memorial trust since 1986. It consists of a citation and a monetary award of 25 lacs.

Q46. Answer: (d) 10√3/(√3 - 1)

Shortcut Trick

For a building of height h, if the shadow increases by d when the angle changes from θ1 to θ2:

Use the formula: h = d / (cotθ2 − cotθ1)

=> h = 10 / (cot 45° − cot 60°)

=> h = 10 / (1 − 1/√3) = 10 / [(√3 − 1)/√3] = 10√3 / (√3 − 1)

Therefore The correct answer is 10√3/(√3 − 1) m.

Alternate Method

Given: Shadow increase (CD) = 10 m, Angle θ1 = 60°, Angle θ2 = 45°.

Formula Used: tanθ = Perpendicular / Base

=> In ΔABC, tan 60° = AB/BC => √3 = h/BC => BC = h/√3

=> In ΔABD, tan 45° = AB/BD => 1 = h/(BC + 10)

=> h = BC + 10

=> h = h/√3 + 10

=> h − h/√3 = 10 => h(1 − 1/√3) = 10

=> h[(√3 − 1)/√3] = 10 => h = 10√3 / (√3 − 1)

Therefore The correct answer is 10√3/(√3 − 1) m.

Additional Information

Trigonometric Ratios of standard angles

tan 45° = 1, tan 60° = √3, and tan 30° = 1/√3 are frequently used in Heights and Distances problems.

Angle of Elevation vs Depression

The angle of elevation is measured from the horizontal upward to the object, while the angle of depression is measured from the horizontal downward.

Shadow length relation

As the angle of elevation of the sun decreases, the length of the shadow of a vertical object increases.

Q47. Answer: (c) Arijit Singh

The correct answer is Arijit Singh.

Key Points

• Arijit Singh wins Best Male playback Singer at the 63rd Filmfare Awards for the song " Roke Na Ruke Naina " from Badri ki Dulhania.

• He is the recipient of the National Award and six Filmfare Awards.

Additional Information

• Ankit Tiwari is an Indian playback singer, Music Director, Composer. He got the best Male playback Singer Award in 2015 for the Galliyan song.

• Atif Aslam is a Pakistani playback singer and actor.

• Armaan Malik is an Indian Singer, Songwriter, record producer, performer and actor. He is known for his Singing in Multiple Languages.

Q48. Answer: (b) Saikom Mirabai Chanu

The correct answer is Saikom Mirabai Chanu.

Key Points

• Saikom Mirabai Chanu is an Indian Weightlifter in the 48kg category, Chanu has won the World Championships and multiple Medals at the Commonwealth Games.

• She was awarded Padma Shri by the government of India for her contributions to sports, also awarded for the Rajiv Gandhi Khel Ratna award.

• Mirabai Chanu became the first Indian in more than two decades to claim a gold medal at the World Weightlifting Championship in Anaheim, USA, exorcising the ghosts of her forgettable outing at the Rio Olympics.

• Nameirakpam Kunjarani Devi is the most decorated Indian sportswoman in Weightlifting. She was awarded the Arjuna award for Weightlifting. She won seven world championship Silver Medals and two Asian games Bronze.

• Ngangbam Soniya Chanu is an Indian Woman Weightlifter. She won the silver medal in the Women's 48kg category at the 2010

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Commonwealth Games. She awarded the Arjuna award for weightlifting.

• D.Kavita Devi has represented India in International competition, she won gold in the 75kg category at the 2016 South Asian Games. It is the first-ever woman to compete in WWE.

Q49. Answer: (c) weak acid and strong base

The correct answer is a weak acid and a strong base.

Key Points

• The pH of a solution is defined as the negative logarithm of the hydrogen ion concentration in moles per litre.

• It is also defined as the potenz of hydrogen i.e. power of hydrogen.

pH = –log [H+] or pH = –log [H3O+].

• The pH scale is used to indicate the acidic and basic nature of compounds. It also called a universal indicator.

• Acids are those when dissolves in water produce H+ ions, they are sour in taste, turns blue litmus to red.

• For example - H2SO4, HCl, HNO3 - Strong acid, CH3COOH, H2CO3 - Weak acid.

• Bases are those when dissolves in water produce OH– ions, they are bitter in taste, turns red litmus to blue.

• For example - NaOH, Mg(OH)2 - Strong base, NH4Cl - Weak base. Soluble bases are called as Alkali.

• Salts are the neutral compounds, formed by the ionic reaction between acids and bases, they are salty in taste. salts are electrically neutral.

• On the pH scale, acids having a pH less than 7, bases having a pH More than 7, and salts are having a pH value equal to 7 for neutral salts (strong acid and strong base).

• Acidic salts are the salts with weak base and strong acid pH less than 7, for example- NH4Cl.

• Basic salts are the salts with weak acid and strong base pH of more than 7, for example- Na2CO3.

Q50. Answer: (a) D

All letters except ‘N’ are Greek Alphabets, while ‘N’ is a general English alphabet.

Hence, ‘N’ is the odd one out.

Q51. Answer: (c) Cu + Sn

The correct answer is Cu + Sn.

Additional Information

• An alloy is a homogenous mixture of two or more metals, or a metal and a non-metal.

• Cu + Zn alloy called Brass. It is used where low friction and corrosion resistance is required, such as locks, hinges, gears, bearings, hose couplings, valves, etc.

• Cu + Sn alloy called Bronze, are not good conductors of electricity. whereas copper is used for making electrical circuits.

• Pb + Sn alloy called Solder has a low melting point and is used for welding electrical wires together.

• Al + Cu + Mn + Mg alloy called Duralumin. It is strong, hard, lightweight, an alloy of aluminium. It is used for aircraft construction.

• Al - aluminium, Cu - copper, Mn- manganese, Mg- magnesium, Pb- lead, Zn- zinc, Sn- tin.

Q52. Answer: (a) Rajiv Kumar

The correct answer is Rajiv Kumar.

Key Points

• NITI Aayog (National Institution for Transforming India) was formed via a resolution of the union cabinet on January 1, 2015.

• NITI Aayog is the premier policy 'Think tank of the government of India' providing both directional and policy inputs.

• NITI Aayog replaced The Planning commission.

• The chairperson of NITI Aayog is Shri Narendra Modi Hon'ble Prime Minister.

• The vice-chairman of NITI Aayog is Dr Rajiv Kumar is a leading Indian Economist and took charge of the rank and status of a cabinet minister on 1st September 2017.

Important Points

• Dr Suman K Berry is the current vice-chairman of NITI Aayog. (As of April 2022).

Additional Information

• Rajeev Mehrishi was the 13th comptroller and auditor general of India and vice-chairman of the united nations panel of External Auditors.

• He was appointed as the home secretary of India on 31 august 2015.

• Mehrishi appointed as India's top public auditor in 2017.

• Amitabh Kant is presently CEO of NITI Aayog.

• Arvind Shubhramaniyam is an India Economist and the former Chief Economic Advisor to the government of India, having taken charge of the position from 16th October 2014 to 20th June 2018, succeeding Raghuram Rajan.

Q53. Answer: (c) 15,000 L

Shortcut Trick

Volume of cuboid = Length × Breadth × Depth

Volume = 5 m × 3 m × 1 m = 15 m^3

Since 1 m^3 = 1000 litres

Capacity = 15 × 1000 = 15,000 litres

Therefore The correct answer is 15,000 L.

Alternate Method

Given:

Length (l) = 5 m

Breadth (b) = 3 m

Depth/Height (h) = 1 m

Formula Used:

Volume of Rectangular Tank = l × b × h

Conversion: 1 m^3 = 1000 litres

Calculations:

=> Volume = 5 × 3 × 1

=> Volume = 15 m^3

=> Capacity in litres = 15 × 1000 litres

=> Capacity = 15,000 litres

Therefore The correct answer is 15,000 L.

Additional Information

Unit Conversion

1 m^3 = 1,000,000 cm^3 and 1 litre = 1000 cm^3. Therefore, 1 m^3 = 1000 litres.

Total Surface Area of Cuboid

TSA = 2(lb + bh + hl). It represents the total area of all six faces of the water tank.

Lateral Surface Area

LSA = 2h(l + b). This is the area of the four side walls of the tank excluding top and bottom.

Q54. Answer: (c) South

In chess, the players always sit in front of each other.

If Supriya is facing North, then Pallavi is definitely facing at South.

From the following figure.

Hence, South is the correct answer.

Q55. Answer: (d) 3 : 8

The correct answer is 3:8.

Important Points

• Mass- It is a measure of the amount of matter in an object. It is usually measured in grams or kilograms.

• In Chemistry, Mass ratio often called "per cent composition by mass", is the proportion of a particular molecule that consists of each that molecule's constituent elements.

• This principle gives rise to the law of constant proportion by Joseph Proust in 1800.

• A given compound always has the same proportion by mass of its constituent elements.

• For example - water always has exactly 8gm of oxygen for every 1gm of hydrogen, i.e. 1:8.

• The mass is calculated by the mass number of an element given in the periodic table and represented by 'A' in an element.

• The mass of hydrogen in H_2O is 2×1 = 2gm (it contains 2 moles of hydrogen) and the mass of oxygen in H_2O is 16gm (it contains 1 mole of oxygen) = 2:16 = 1:8.

• As the mass number of oxygen is 16 and the mass number of hydrogen is 1.

CALCULATION:-

• The mass of carbon in CO_2 is 12gm (carbon has one molecule).

• The mass of oxygen in CO_2 is 2×16 = 32gm (oxygen has two molecules)

• So, the ratio of their masses is 12:32 = 3:8.

• In 1 mole of CO_2, there is 1 mole of carbon and 2 moles of oxygen.

Q56. Answer: (c) 3.75

The correct answer is 3.75.

Key Points

Electric Power - The rate of doing work is called power. This is also the rate of consumption of energy. The rate at which electric energy is dissipated or consumed in an electric circuit is also termed as electric power.

• The power P is given by P = VI Or P = $I^2R = V^2/ R$.

• The S.I. Unit of electric power is the watt (W). It is the power consumed by a device that carries 1 A of current when operated at a potential difference of 1 V. Thus, 1 W = 1 Volt × 1 ampere = 1 V A.

• The unit 'watt' is very small. Therefore, in actual practice, we use a much larger unit called 'kilowatt'. it is equal to 1000 watts.

• Electric energy is the product of power and time, the unit of electric energy is 'watt-hour' (W h).

• 1 watt-hour is the energy consumed when 1 watt of power is used for 1 hour. The commercial unit of electric energy is kilowatt-hour (KW h), commonly known as Units.

• 1 KW h = 1000 watts × 3600 seconds = 3.6 × 10^6 watt second = 3.6 × 10^6 joule (J).

CONCEPT: Electric energy = Power × Time

CALCULATION: ^

• power = 1250 watt = 1.25 kw,

• time = 3 hours

• electric energy = ?

BY FORMULA:

Electric energy = power × time

Electric energy = 1.25 kw × 3 h

Electric energy = 3.75 kw h or 3.75 units

So, the electric energy consumption per day by an electric iron is 3.75 units.

Q57. Answer: (c) 11 years

Let the age of B be x years.

A = x + 3 and C = 2x

According to question:

(x + 3) + x + 2x = 35

=> x + 3 + x + 2x = 35

=> 4x = 35 – 3

=> 4x = 32

=> x = 8

So, A's age = (x + 3) = (8 + 3) = 11 years.

Hence, '11 years' is the correct answer.

Q58. Answer: (d) Pb and Hg

The correct answer is Pb and Hg.

Important Points

• Pb is a symbol of Lead. Hg is a symbol of Mercury.

• Mercury holds out against the removal of electron and behaves like a noble gas by forming a weak bond, thus it is a bad conductor of heat.

• Lead has less metallic character, so it is a poor conductor of heat.

• Lead lies in group 14 of the modern periodic table and metallic characters decrease, as we move left to right in the periodic table.

• Metals are usually the best conductors of thermal energy metals are chemically bonded: metallic bonds (as opposed to covalent or ionic bonds) have free-moving electrons which are able to transfer thermal energy rapidly through the metal.

• Lead lacks this kind of electrons so it's a poor conductor of heat. But compared to non-metal it's conductivity is quite higher.

• The heat flows from a hotter object to a colder object. The process by which heat is transferred from the hotter end to the colder end of an object is known as conduction.

• The materials which allow heat to pass through them easily are conductors of heat. For examples, aluminium, iron and copper.

• The materials which do not allow heat to pass through them easily are poor conductors of heat such as plastic and wood.

• Poor conductors are known as insulators.

• Silver and copper are the two best conductors of heat and electricity.

Additional Information

• In the winter, we use woollen clothes. Wool is a poor conductor of heat. Moreover, there is air trapped in between the wool fibres. This air prevents the flow of heat from our body to the cold surroundings. So, we feel warm.

Q59. Answer: (b) Meira Kumar

The correct answer is Meira Kumar.

Important Points

• Ram Nath Kovind is the 14th President of India.

• Last presidential election held on 17th July 2017.

• He was earlier the Governor of Bihar.

• He is a successor of former President Pranab Mukherjee.

• Mr Kovind was a lawyer by profession.

• In the presidential election, he was backed by National Democratic Alliance.

• Meira Kumar was the first women speaker of Lok Sabha from 2009 to 2014. She has earlier served as Minister of Social Justice and Empowerment in UPA government from 2004 to 2009.

Additional Information

• Term of President is five years, although he can be re-elected by the members of the electoral college.

• President can be impeached for violation of the Constitution under Article 61.

• In his absence, Vice President holds his power and if Vice President is also not available then the Chief Justice of India will hold the office of the president.

Q60. Answer: (a) 12.5%

Shortcut Trick

Use the ratio-unitary method where 18 × CP = 16 × SP.

The ratio of SP : CP = 18 : 16 which simplifies to 9 : 8.

Gain = 9 − 8 = 1 unit.

Gain% = (Gain ÷ CP) × 100 = (1 ÷ 8) × 100.

Gain% = 12.5%.

Therefore The correct answer is 12.5%.

Alternate Method

Given: Cost Price (CP) of 18 apples = Selling Price (SP) of 16 apples.

Formulas: Profit = SP − CP | Profit% = (Profit ÷ CP) × 100

=> Let CP of 1 apple be 1.

=> CP of 18 apples = 18.

=> SP of 16 apples = 18.

=> CP of 16 apples = 16.

=> Profit = 18 − 16 = 2.

=> Profit% = (2 ÷ 16) × 100 = 12.5%.

Therefore The correct answer is 12.5%.

Additional Information

Profit and Loss on Quantity

When the CP of x items equals the SP of y items, the gain or loss is determined by the difference in quantities relative to the items sold. Formula: [(x − y) ÷ y] × 100.

Cost Price (CP)

The amount at which an article is purchased or the cost incurred to manufacture it.

Q61. Answer: (b) 19161914

The logic is:

Letters are replaced by their place value.

P	O	L	A	N	D
16	15	12	1	14	4

Similarly,

S	P	A	I	N
19	16	1	9	14

Hence, '19161914' is the correct answer.

Q62. Answer: (d) New Zealand

The correct answer is New Zealand.

Important Points

• It was the twelfth edition ICC Under-19 Cricket World Cup.

• It was held in New Zealand from 13 January to 3 February 2018.

• The final was played at Bay Oval cricket ground in Mount Maunganui.

• Indian team won the match against Australia. India won the Fourth ICC Under-19 Cricket World Cup title, maximum by any team.

• Sixteen countries participated in the tournament.

• Shubman Gill of India was a man of the series.

• Alick Athanaze of the West Indies made most runs (418) in the tournament.

Additional Information

• Some upcoming important sports event and their host.

Sports event	Host
2022 Commonwealth Games	Birmingham, England
2022 Asian Games	China
2024 Olympic Games	Paris, France
2022 Para Olympics	Beijing, China
2023 ICC World Cup Cricket	India

Q63. Answer: (d) v = u + at

The correct answer is v = u + at.

Important Points

Initials	Stands for
v	Final velocity
u	Initial velocity
a	Acceleration
t	Time

• When an object moves along a straight line with uniform acceleration, it is possible to relate its velocity, acceleration during motion and the distance covered by it in a certain time interval by a set of equations known as the equations of motion.

• There are three such equations.

• v = u + at

• 2as = v2 – u2

• s = ut + ½ at2

• Option 2, 3, and 4 explains such equations.

• v = u + at describes the velocity-time relation.

Additional Information

• $s = ut + \frac{1}{2}at^2$ represents the position-time relation.

• $2as = v^2 – u^2$ represents the relation between the position and the velocity.

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Q64. Answer: (b) 1 ampere

The correct answer is 1 ampere.

Important Points

• One coulomb is the charge flowing through a wire in 1 second if the current is 1 Ampere. A coulomb is a unit of electric charge.

• A coulomb is a name given in memory of French physicist Charles Augustin de Coulomb.

• Coulomb force and gravitational force follow the same inverse-square law.

• But gravitational force has only one sign (always attractive), while Coulomb force can be of both signs (attractive and repulsive), allowing the possibility of cancellation of electric force.

Additional Information

SI unit	SI unit of
Volt	Electric potential difference
Watt	Power
Ohm	Resistance

Q65. Answer: (a) Pritzker Award

The correct answer is the Pritzker Award.

Important Points

• Balkrishna Doshi apart from Pritzker Award won several other prestigious awards likes Padma Bhushan (the third-highest civilian award in India), Padma Shri (the fourth highest civilian award in India), Aga Khan Award for Architecture, and Ordre des Arts et des Lettres (A award by the French government).

• He is the first Indian to win the Pritzker Award in the year 2018.

• He was born in Pune in August 1927 and he is an alumnus of J. J. School of Architecture, Mumbai.

• Some of his recognised works include - National Institute Of Fashion Technology - Delhi, IIM Bangalore, Centre for Environmental Planning and Technology - Ahmedabad.

Additional Information

• Pritzker Award is one of the most prestigious prizes in Architecture. The prize is awarded annually.

• Started in 1979 by Jay A. Pritzker and his wife. The prize money is $100000.

Q66. Answer: (c) Rs. 123.79

Shortcut Trick

Total amount before withdrawal = 713.39 + 450.75 = 1164.14

Total cost of 5 shirts = Total amount − Remaining balance

=> 1164.14 − 545.19 = 618.95

Price of each shirt = 618.95 ÷ 5 = 123.79

Therefore The correct answer is Rs. 123.79.

Alternate Method

Given:

Initial balance = Rs. 713.39

Deposit amount = Rs. 450.75

Remaining balance = Rs. 545.19

Number of shirts = 5

Calculations:

=> Total amount in bank = 713.39 + 450.75 = 1164.14

=> Let the price of one shirt be x.

=> Total cost of shirts = 5 × x = 5x

=> Equation: 1164.14 − 5x = 545.19

=> 5x = 1164.14 − 545.19

=> 5x = 618.95

=> x = 618.95 ÷ 5

=> x = 123.79

Therefore The correct answer is Rs. 123.79.

Additional Information

Unitary Method

It is a technique for solving a problem by first finding the value of a single unit, and then finding the necessary value by multiplying the single unit value.

Bank Balance Equation

Final Balance = (Initial Balance + Deposits) − Withdrawals. This is the fundamental accounting identity used for personal finance calculations.

Decimal Arithmetic

While subtracting or adding decimals, ensure the decimal points are aligned vertically to maintain place value accuracy.

Q67. Answer: (b) K71

Given series: 3 R # 2 A $ K 5 % T 7 & N Y + X B / L Q @ 1

If the second half of the above series is reversed then the new series is:

3 R # 2 A $ K 5 % T 7 1 @ Q L / B X + Y N &

1) A%@ → Gap of three terms between the given set of letters and symbol.

2) K71 → Gap of three terms between K and 7, but 1 is immediately followed by 7.

3) $TQ → Gap of three terms between the given set of letters and symbol.

4) 251 → Gap of three terms between the given set of numbers.

Hence, ‘K71’ is the odd one out.

Q68. Answer: (a) Husband

The family tree diagram is shown below:

Vinay’s only sister’s father related is husband of Srividhya.

Hence, ‘husband’ is the correct answer.

Q69. Answer: (b) 36

Anish is thrice as old as his son and the sum of their ages is 48 years

Let the age of Anish’s son be x years.

So, age of Anish = 3x

According to question:

3x + x = 48

=> 4x = 48

=> x = 12

So, Anish’s age = 3x = (3 × 12) = 36 years.

Hence, ‘36’ is the correct answer.

Q70. Answer: (a) Only conclusion I follows

I. Terrorists always target destruction at a larger scale. → True (As, “The tourism spots should be given extra security” → Tourist spots generally are populated by tourists, because of which terrorists target these areas to cause destruction at a larger scale)

II. One cannot prevent terrorism act. → False (As, The tourism spots should be given extra security, securities are put to prevent terrorism.)

Hence, only conclusion I follows.

Q71. Answer: (c) Grand daughter

The family tree diagram is shown below:

So, Pallavi is ‘grand daughter’ of her mother’s only brother’s mother.

Hence, ‘Grand daughter’ is the correct answer.

Q72. Answer: (c) anther

The correct answer is anther.

Important Points

• The pollen grains represent the male gametophytes.

• The transfer of pollen from the anther to the stigma of a flower is called pollination.

• Cross-pollination is defined as the deposition of pollen grains from a flower to the stigma of another flower.

Additional Information

• The male gametes are found inside the pollen grains and female gametes are found in the ovule.

• Pollen grains are generally spherical measuring about 25-50 micrometres in diameter. It has a prominent two-layered wall. The hard outer layer called the exine is made up of sporopollenin which is one of the most resistant organic materials known.

Q73. Answer: (a) Azerbaijan

The correct answer is Azerbaijan.

Important Points

• Azerbaijani manat is the currency of Azerbaijan.

• Azerbaijan is a European country in the boundaries of Europe and Asia, Baku as its capital.

• Majority of the population i.e more than 95 % of the people follow Islam.

• Ilham Aliyev is the president and Ali Asadov is the prime minister of the country.

Additional Information

Country	Currency	Capital
Armenia	Armenian dram	Yerevan
Albania	Albanian Lek	Tirana
Andorra	Euro	Andorra la Vella
Croatia	Croatian Kuna	Zagreb
Denmark	Denish Crone	Copenhagen
Romania	Romanian Leu	Bucharest
Bulgaria	Bulgarian Lev	Sofia
Russia	Rubble	Moscow
Hungary	Hungarian forint	Budapest

Q74. Answer: (c) 23

The correct answer is 23.

Mistake Points

• Please note that the term 'germ cell' refers to the diploid cell that undergoes meiosis to form the gametes.

• The gametes always carry half the amount of chromosome present in an organism.

• For humans there are 23 pairs or 46 chromosomes, meaning they are diploid(2n). When these undergo meiosis, the chromosome number is halved.

Therefore, the total number of chromosomes in a female germ cell (gamete) will be 23.

Important Points

• There are 23 pairs of chromosomes in the human female germ cell.

• Chromosomes in the nucleus of a cell contain information for the inheritance of features from parents to the next generation in the form of DNA (Deoxyribonucleic Acid) molecules.

• The important things to remember are that chromosomes, as well as genes, occur in pairs.

• In a multicellular organism, the reproductive cells are called germ cells.

Additional Information

• The DNA in the cell nucleus is the information source for making proteins. If the information is changed, different proteins will be made. Different proteins will eventually lead to altered body designs.

• Therefore, a basic event in reproduction is the creation of a DNA copy.

Q75. Answer: (b) 17000 Hz

The correct answer is 17000 Hz.

Important Points

• According to the question:

• Velocity V = 340m/s

• Wavelength (λ) = 2cm = 0.02m

• Frequency (f) =?

• We know that

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• Velocity = Frequency multiplied by Wavelength
• 340 = f × 0.02
• f = 340 / 0.02.
• Frequency = 17,000Hz.

Additional Information

• The sound wave is the propagation of disturbance (in pressure density) in air, without the motion of air medium as a whole.
• Sound waves travel in the form of compressions and rarefactions of small volume elements of air.

Q76. Answer: (b) white

The correct answer is white.

Important Points

• Magnesium ribbon burns with a dazzling white flame.
• We know that magnesium ribbon burns with a dazzling white flame and changes into a white powder.
• This powder is magnesium oxide.
• It is formed due to the reaction between magnesium and oxygen present in the air.

Additional Information

• A ribbon of magnesium metal which is generally used in laboratories is known as magnesium ribbon.
• When a magnesium ribbon is burnt in oxygen, it gets converted to magnesium oxide.
• It can be very well explained by an equation,
• Magnesium + Oxygen (Reactants) → Magnesium oxide (Product)

Q77. Answer: (d) Both I and II are implicit.

According to the given information,

Assumption I: This is implicit, because there are other oils available in the market.

Assumption II: This is also implicit, because health is definitely a priority for every individual and their family.

Hence, “both I and II” are implicit.

Q78. Answer: (b) Only 1 is sufficient

Statement 1:

The bag contains 6 blue, 7 red, and 8 orange balls.

By this we known that total number of balls = 6 + 7 + 8 = 21

Statement 2:

The bag is green colour.

This information is not relevant to the question.

Hence, Only 1 is sufficient is the correct answer.

Q79. Answer: (a) glandular skin with hairs

The correct answer is glandular skin with hairs.

Important Points

• Mammals or Mammalia class of animal kingdom are found in a variety of habitats – polar ice caps, deserts, mountains, forests, grasslands and dark caves.
• Some of them have adapted to fly or live in water.
• The most unique mammalian characteristic is the presence of milk-producing glands (mammary glands) by which the young ones are nourished.
• They have two pairs of limbs, adapted for walking, running, climbing, burrowing, swimming or flying.
• The skin of mammals is unique in possessing hair. External ears or pinnae are present. Different types of teeth are present in the jaw. The heart is four-chambered. They are homoiothermous. Respiration is by lungs. Sexes are separate and fertilisation is internal.

Additional Information

Binomial nomenclature of few mammals:

Binomial nomenclature	Animal
Panthera leo	Lion
Panthera tigris	Tiger

Balaenoptera musculus	Blue whale
Canis lupus	Dog
Felis catus	Cat
Elephas maximus indicus	Elephant
Equus caballus	Horse

Q80. Answer: (c) Rs. 3,62,800

Given:

Total revenue of the company = Rs.36,28,000

Calculation:

Share of jacket in the total revenue of the company = 10%

10% of 36,28,000

=> (10/100) × 36,28,000

=> 362800

Therefore Revenue made with the sale of Jackets = Rs. 362800

Q81. Answer: (c) 1^(st) July 2017

The correct answer is 1st July 2017.

Important Points

• The GST was passed on 1st July 2017.

• State Legislatures of different States have passed respective State Goods and Services Tax Bills. After the enactment of various GST laws, GST was launched with effect from 1st July 2017 by our Prime Minister Narendra Modi, in the presence of Sh. Pranab Mukherjee, the then President of India in a midnight function at the Central Hall of Parliament of India.

Additional Information

• On 19th December 2014, The Constitution (122nd Amendment) Bill 2014 was introduced in the Lok Sabha and was passed by Lok Sabha in May 2015.

• The Bill was passed by the Rajya Sabha on 3rd August 2016 and by the Lok Sabha on 8th August 2016. After ratification by the required number of State legislatures and assent of the President, the Constitutional amendment was notified as Constitution (101st Amendment) Act 2016 on 8th September 2016. The Constitutional amendment paved the way for the introduction of Goods and Services Tax in India.

Q82. Answer: (c) 19 S

The logic is:

Hence, ‘19S’ is the correct answer.

Q83. Answer: (c) Both the conclusions follow

I. Young mothers need to spend more time with their kids in the initial years. → True (As, Given statement concludes that flexible working hours will give mothers enough time with their kids)

II. The company cares for their female employees’ obligation and work pressure → True (As, the flexible working hours is for mothers only, and all mothers are females that means company cares about them)

Hence, both the conclusions follow.

Q84. Answer: (a) D

The images in the figure series is moving in anti-clockwise direction.

So, the next image in the series will be as show below:

Hence, ‘option 1’ is the correct answer.

Q85. Answer: (a) 13.5 days

Shortcut Trick

Apply efficiency ratio: 2 × M1 × 1 = 3 × M2 × 1.5 => 2M1 = 4.5M2 => M1/M2 = 4.5/2 = 9/4.

Use MDH formula: M1 × D1 × H1 × E1 = M2 × D2 × H2 × E2

38 × 12 × 6 × 9 = 57 × D2 × 8 × 4

24624 = 1824 × D2 => D2 = 13.5 days.

Therefore The correct answer is 13.5 days.

Alternate Method

Given:

Group 1: 38 men, 6 hours/day, 12 days.

Group 2: 57 men, 8 hours/day, D2 days.

Efficiency Relation: 2 men of Group 1 in 1 hour = 3 men of Group 2 in 1.5 hours.

Calculations:

=> Let efficiency of one man in Group 1 be E1 and Group 2 be E2.

=> 2 × E1 × 1 = 3 × E2 × 1.5

=> 2E1 = 4.5E2 => E1/E2 = 4.5/2 = 9/4

=> Total Work = M1 × D1 × H1 × E1 = 38 × 12 × 6 × 9

=> For Group 2: 57 × D2 × 8 × 4 = 38 × 12 × 6 × 9

=> 1824 × D2 = 24624

=> D2 = 24624 ÷ 1824 = 13.5 days

Therefore The correct answer is 13.5 days.

Additional Information

Chain Rule Formula

The relation between Work (W), Men (M), Days (D), Hours (H) and Efficiency (E) is given by (M1D1H1E1)/W1 = (M2D2H2E2)/W2.

Work and Efficiency

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

Q86. Answer: (c) Dobereiner

The correct answer is Dobereiner.

Important Points

• On July 27, 1823, Dobereiner made a remarkable observation when working with platinum sponge. When a jet of hydrogen mixed with air was directed on the sponge, the hydrogen caught fire immediately.

• Dobereiner noted that he could repeat the experiment, which took place at room temperature, at lower temperatures as well.

• Swedish chemist Jons Jacob Berzelius, seen as one of the founders of modern chemistry, wrote about it at the time as “the most brilliant discovery of last year”.

• Dobereiner’s experiments, in fact, helped Berzelius in developing the concept of catalysis. It was Berzelius who coined the word “catalysis” in 1835

Additional Information

• While creating a fire this way might seem unremarkable now, we must remember that there was still no easy way to produce fire in 1823 – using flint and tinder was still the dominant way of creating fire.

• Dobereiner’s discovery led him to an application that could be used for lighting purposes. The Dobereiner Feuerzeug (Dobereiner’s lamp) or hydroplatinic lamp or briquet a hydrogene (hydrogen lighter) was the go-to lighting gadget for decades until it was finally replaced by, well yes, the matchstick. (Source: TH)

Q87. Answer: (b) Conclusion 1 alone follows

The least possible venn diagram is:

1. Some earth are brown. → True (As, Some brown are earth so, some earth are brown is definitely true)

2. No mugs are earth. → False (This is possible but not definite)

Hence, conclusion 1 alone follows.

Q88. Answer: (b) It controls movements, speech, sight, smell, taste, hearing, intelligence etc.

Option 2 is not correct.

• The cerebellum does not controls movements, speech, sight, smell, taste, hearing, intelligence etc.

Important Points

• The activities like walking in a straight line, riding a bicycle, picking up a pencil are possible due to a part of the hindbrain called the cerebellum.

• It is responsible for the precision of voluntary actions and maintaining the posture and balance of the body.

• It is a part of the hind brain.

Additional Information

• The brain has three such major parts or regions, namely the forebrain, midbrain and hindbrain.

• The forebrain is the main thinking part of the brain. It has regions which receive sensory impulses from various receptors.

• There is another set of muscle movements over which we do not have any thinking control. Many of these involuntary actions are controlled by the midbrain and hindbrain.

• All these involuntary actions including blood pressure, salivation and vomiting are controlled by the medulla in the hindbrain.

Q89. Answer: (a) Directly beneath the point of suspension

The correct answer is Directly beneath the point of suspension.

Important Points

• The center of gravity of any freely suspended object lies directly beneath the point of suspension.

• The force that causes this acceleration and keeps the body moving along the circular path is acting toward the center. This force is called the centripetal (meaning 'center-seeking') force.

• Every object in the universe attracts every other object with a force that is proportional to the product of their masses and inversely proportional to the square of the distance between them.

Additional Information

• Three laws of Newton are as follows:

• First law - Everybody continues to be in its state of rest or of uniform motion in a straight line unless compelled by some external force to act otherwise.

• Second law - The rate of change of momentum of a body is directly proportional to the applied force and takes place in the direction in which the force acts.

• Third Law - To every action, there is always an equal and opposite reaction.

Q90. Answer: (b) Paternal grandfather

The family tree diagram is shown below:

Hence, Z is the 'paternal grandfather' of R.

Q91. Answer: (d) Indira Gandhi

The correct answer is Indira Gandhi.

Important Points

• On 25th June 1975, National emergency was imposed during the reign of then Prime Minister of India, Indira Gandhi.

• Fakhruddin Ali Ahmed was the President of India when National emergency was imposed. He was the fifth President of India.

• National Emergency was for the period of 21 months.

• National Emergency can be declared under Article 352.

Additional Information

• Constitutional Emergency can be imposed under Article 356.

• Financial Emergency can be imposed under Article 360. Till now Financial Emergency has never been imposed in our country.

Q92. Answer: (d) New Delhi

The correct answer in New Delhi.

Important Points

• The fifth edition of the South Asia Region Public Procurement Conference was held in New Delhi on 5th - 7th February 2018.

• The theme of the fifth conference was Public Procurement and Service Delivery.

• Public Procurement Division (PPD) of the Ministry of Finance, hosted the Conference. It is sponsored by the World Bank, Asian Development Bank and Islamic Development Bank.

• There are eight countries in the South Asia Region and they are the Maldives, Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka.

Additional Information

• The objective of this conference is to make the learning of officers from different countries from one another in the field of public procurement.

• The first conference was held in Kathmandu in 2010.

Q93. Answer: (d) Sclerenchymatous fibres

The correct answer is Sclerenchymatous fibres.

Important Points

• Sclerenchymatous tissue is one of the permanent tissue.

• It is the tissue which makes the plant hard and stiff like a husk of a coconut. It is made of sclerenchymatous tissue.

• The cells of this tissue are dead. They are long and narrow as the walls are thickened due to lignin.

• Often these walls are so thick that there is no internal pace inside the cell. This tissue is present in stems, around vascular bundles, in the veins of leaves and in the hard covering of seeds and nuts.

• It provides strength to the plant parts.

Additional Information

• The outermost layer of cells called the epidermis. The epidermis is usually made of a single layer of cells.

• The tissue is a group of cells similar in structure and function. Plant tissues are of two main types – meristematic and permanent.

• Parenchyma, collenchyma and sclerenchyma are three types of simple tissues. Xylem and phloem are types of complex tissue.

Q94. Answer: (b) 27

The logic is:

Hence, '27' is the correct answer.

Q95. Answer: (d) 144

Shortcut Trick

Assume Total students = 4 × 5 × 3 = 60 units (LCM of denominators).

German = 1/4 × 60 = 15; Remaining = 45.

Italian = 2/5 × 45 = 18; Remaining = 27.

French = 2/3 × 27 = 18; Japanese = 27 − 18 = 9 units.

Given 9 units = 72 → 1 unit = 8. So, Italian = 18 × 8 = 144.

Therefore The correct answer is 144 students.

Alternate Method

Given: Japanese learners = 72.

Formula: Total × (1 − r1) × (1 − r2) × ... = Final value.

=> Let Total students be x.

=> Remaining after German = x × (1 − 1/4) = 3x/4.

=> Remaining after Italian = 3x/4 × (1 − 2/5) = 3x/4 × 3/5 = 9x/20.

=> Japanese students = 9x/20 × (1 − 2/3) = 9x/20 × 1/3 = 3x/20.

=> 3x/20 = 72 => x = (72 × 20) ÷ 3 = 480.

=> Italian students = 2/5 of remaining after German = 2/5 × (3/4 × 480).

=> Italian students = 2/5 × 360 = 144.

Therefore The correct answer is 144 students.

Additional Information

Fraction of Remainder Pattern

When fractions are applied to the remaining balance, the effective fraction of the whole is the product of the current fraction and all preceding (1 − fraction) terms.

LCM Method for Fractions

To avoid decimals, assume the total to be the LCM of all denominators in the question (4, 5, and 3 in this case).

Successive Change Formula

Final = Initial × (1 ± r1) × (1 ± r2), often used in population or depreciation problems.

Q96. Answer: (b) 9 : 10

Shortcut Trick

Ratio of interior angles = [(n1−2)/n1] : [(n2−2)/n2]

For Octagon (n1 = 8) and Dodecagon (n2 = 12):

Ratio = (6/8) : (10/12) = (3/4) : (5/6)

Cross-multiplying gives (3 × 6) : (5 × 4) = 18 : 20 = 9 : 10.

Therefore The correct answer is 9 : 10.

Alternate Method

Given: Number of sides of a regular octagon (n1) = 8 and a regular dodecagon (n2) = 12.

Formula Used: Each interior angle of a regular polygon = [(n − 2) × 180°] / n

=> Interior angle of octagon = [(8 − 2) × 180°] / 8

=> Interior angle of octagon = (6 × 180°) / 8 = 135°

=> Interior angle of dodecagon = [(12 − 2) × 180°] / 12

=> Interior angle of dodecagon = (10 × 180°) / 12 = 150°

=> Required Ratio = 135 : 150

=> Required Ratio = 9 : 10

Therefore The correct answer is 9 : 10.

Q97. Answer: (a) 0

Shortcut Trick

Observe the coordinates: (a, b + c), (b, c + a), and (c, a + b).

Note that for each point, the sum of x and y coordinates is (a + b + c).

Since x + y = k (constant) for all points, they lie on a straight line.

Points on a straight line are collinear, meaning the area of the triangle formed by them is 0.

Therefore The correct answer is 0.

Alternate Method

Given: Vertices (x1, y1) = (a, b + c), (x2, y2) = (b, c + a), (x3, y3) = (c, a + b).

Formula Used: Area = 1/2 |x1(y2 − y3) + x2(y3 − y1) + x3(y1 − y2)|

=> Area = 1/2 |a(c + a − (a + b)) + b(a + b − (b + c)) + c(b + c − (c + a))|

=> Area = 1/2 |a(c − b) + b(a − c) + c(b − a)|

=> Area = 1/2 |ac − ab + ab − bc + bc − ac|

=> Area = 1/2 |0|

=> Area = 0

Therefore The correct answer is 0.

Additional Information

Collinear Points

If three points lie on the same straight line, the area of the triangle formed by them is always 0.

Determinant Method for Area

The area can also be found using the determinant of a 3×3 matrix with rows [x_i, y_i, 1]. If the determinant is 0, points are collinear.

Sum of Coordinates Property

If for a set of points (x, y), x + y = Constant, then all such points lie on a line with a slope of −1.

Q98. Answer: (c) 4/20

Calculation:

Considering the given fractions

1/8,2/12,3/16,4/20

LCM of 8, 12, 16, 20 = 240

=> 30, 40, 45, 48

Therefore (4/20) is the largest fraction

Q99. Answer: (d) 35°

Shortcut Trick

In a right-angled triangle, the two acute angles are always complementary.

Sum of acute angles = 90°

Other acute angle = 90° − 55° = 35°

Therefore The correct answer is 35°.

Alternate Method

Given:

Type of triangle = Right-angled triangle

One acute angle (angle A) = 55°

One angle (Right angle, angle B) = 90°

Formula Used:

Angle Sum Property of a triangle: The sum of all interior angles of a triangle is 180°.

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Calculations:

=> angle A + angle B + angle C = 180°

=> 55° + 90° + angle C = 180°

=> 145° + angle C = 180°

=> angle C = 180° − 145°

=> angle C = 35°

Therefore The correct answer is 35°.

Additional Information

Complementary Angles

Two angles are complementary if their sum is exactly 90°.

Supplementary Angles

Two angles are supplementary if their sum is exactly 180°.

Pythagoras Theorem

In a right-angled triangle, Hypotenuse² = Base² + Perpendicular².

Q100. Answer: (c) 4

Shortcut Trick

Total work in terms of man-days:

6 skilled × 8 = 48 skilled days => 1 skilled = 1/48 of work per day

9 unskilled × 12 = 108 unskilled days => 1 unskilled = 1/108 of work per day

For 4 skilled and 18 unskilled workers, 1 day work = 4/48 + 18/108 = 1/12 + 1/6 = 3/12 = 1/4 of work

Total days required = 4 days

Therefore The correct answer is 4 days.

Alternate Method

Given:

Time taken by 6 skilled workers = 8 days

Time taken by 9 unskilled workers = 12 days

Formula Used:

Total Work = Number of workers × Efficiency × Time

Person	Days	Total Work	Efficiency
6 Skilled	8	432	54 (9 per skilled worker)
9 Unskilled	12	36 (4 per unskilled worker)	

Calculations:

=> Efficiency of 1 skilled worker = 54 ÷ 6 = 9 units/day

=> Efficiency of 1 unskilled worker = 36 ÷ 9 = 4 units/day

=> Efficiency of 4 skilled + 18 unskilled workers = (4 × 9) + (18 × 4)

=> Combined Efficiency = 36 + 72 = 108 units/day

=> Required Time = Total Work ÷ Combined Efficiency

=> Required Time = 432 ÷ 108 = 4 days

Therefore The correct answer is 4 days.

Additional Information

Work Equivalency Formula

When different categories of workers are involved, convert their capacities to a common unit using: M1 × D1 × E1 = M2 × D2 × E2.

Efficiency and Time Relationship

Efficiency of a worker is inversely proportional to the time taken to complete a job. If efficiency is doubled, time taken becomes half.

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