RRB NTPC CBT-I Official Paper (Held On: 1 April 2021 Shift 2) (Previous Year Paper)

RRB NTPC • 2021 • 100 questions • 90 minutes • Answer key and solutions

Take this paper as a timed mock test

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

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Q1. When did India launch its first satellite?

(a) 18^(th) April 1975
(b) 21^(th) April 1975
(c) 20^(th) April 1975
(d) 19^(th)April 1975

Q2. The arithmetic mean of a set of 16 observations is 12. If 8 is subtracted from each of six of these observations, then the new arithmetic mean is _____.

(a) 15
(b) 11
(c) 10
(d) 9

Q3. PSLV-C37 successfully carried and deployed a record _____ satellite in sun-synchronous orbits.

(a) 104
(b) 108
(c) 106
(d) 105

Q4. Pradhan Mantri Kisan Sampada Yojana is the flagship programme for boosting investment in:

(a) food processing
(b) education
(c) infrastructure
(d) Swachh Bharat Mission

Q5. Which one of the following is a member of BRICS?

(a) Canada
(b) Bhutan
(c) Indonesia
(d) Brazil

Q6. Four words have been given, out of which three are alike in some manner and one is different. Select the odd one.

(a) Express Train
(b) Domestic Train
(c) Mail Train
(d) Passenger Train

Q7. Where is the headquarters of the Bank for International Settlements located?

(a) Bangkok
(b) Berlin
(c) Barcelona
(d) Basel

Q8. Who wrote the book 'Early Indus Civilisation' in 1948?

(a) GF Dales
(b) John Marshall
(c) Ernest Mackay
(d) REM Wheeler

Q9. What percentage of 3/11 is 1/121 ?

(a) 31/3 %
(b) 331/3 %
(c) 661/3 %
(d) 31/33 %

Q10. Which of the following is an output device?

(a) Keyboard
(b) Monitor
(c) Scanner
(d) Joysticks

Q11. Haidar Ali was the ruler of:

(a) Hyderabad
(b) Kittur
(c) Mysore
(d) Awadh

Q12. The compound interest on Rs. 5,000 for 2 years is Rs. 253.125. What would be the interest if same sum is invested for the same duration at the same rate of simple interest?

(a) Rs. 255
(b) Rs. 240
(c) Rs. 250
(d) Rs. 248

Q13. The river Tapi has its source at:

(a) Brahmagiri
(b) Satpura
(c) Mansarovar lake
(d) Amarkantak

Q14. How many laws of motion were given by Isaac Newton?

(a) Three
(b) Five
(c) Four
(d) Two

Q15. Who gave "Dilli Chalo" slogan during Indian freedom struggle?

(a) Jawaharlal Nehru
(b) Muhammad Ali Jinnah
(c) Mahatama Gandhi
(d) Subhas Chandra Bose

Q16. Mangrove Forest are found in _____.

(a) Upper Himalayan region
(b) Coasts influenced by tides
(c) Thar desert region
(d) Vindhya mountain region

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Q17. Cherry and Kiwi are sisters whose parents are Orange and Melon. Melon is the brother of Grape, who is married to Mango. How is Orange related to Cherry?

(a) Mother
(b) Father's Sister
(c) Father's Brother
(d) Father

Q18. Read the given statement and possible courses of action carefully and decide which course(s) of action logically follow(s) from the statement.

Statement:

The people who were rehabilitated due to the construction of government aluminium mines are protesting the poor living conditions of their new habitat.

Possible courses of action:

A. The government must send a team to these people to inquire about their complaints.

B. The new habitat of these people must be inspected for healthy and safe living conditions.

(a) Only action A follows.
(b) Both actions A and B follow.
(c) Only action B follows.
(d) Neither action A nor B follows.

Q19. Which plant is termed as Green Gold?

(a) Neem
(b) Ginger
(c) Tulsi
(d) Bamboo

Q20. Which Viceroy of India proposed the Vernacular Press Act?

(a) Lord Mayo
(b) Lord Reading
(c) Lord Lawrence
(d) Lord Lytton

Q21. A can do a piece of work alone in 16 days and B can do the work alone in 12 days. Together with C they can complete the work in 3 days. In how many days can C alone do the work?

(a) 31/5
(b) 6 1/3
(c) 17/16
(d) 51/3

Q22. In which of these sites of Indus Civilization have evidences of reservoirs been found?

(a) Lothal
(b) Kot Diji
(c) Kalibangan
(d) Dholavira

Q23. Find the value of :-

$(0.625 \times 0.729 \times 2.89)/(0.0081 \times 0.025 \times 1.7)$

(a) 382.5
(b) 3525
(c) 3825
(d) 352.5

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Q24. If a person drives his scooter at 45 km/hr, he reaches the destination 10 minutes late. If he drives at 60 km/hr, he is only 5 minutes late. In how many minutes should the person complete the journey to reach the destination exactly on time?

(a) 25
(b) 20
(c) 15
(d) 10

Q25. Synthetic fibres catch fire easily, however, the uniforms of firemen have a coating of _____ plastic to make them flame resistant.

(a) rayon
(b) acrylic
(c) nylon
(d) melamine

Q26. The largest coastal salt water lake of India lies in which of the following states?

(a) Andhra Pradesh
(b) West Bengal
(c) Kerala
(d) Odisha

Q27. Which part of the earth is the main source of magma?

(a) Inner Crust
(b) Core
(c) Outer Crust
(d) Mantle

Q28. A trader mixes 20 kg of one variety of rice at Rs. 52 per kg with 60 kg of another variety at Rs. 36 per kg. If he sells that mixed rice at Rs. 44 per kg, his profit percent is _____.

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

Q29. Four words have been given, out of which three are alike in some manner and one is different. Select the odd one.

(a) Vaccination
(b) Digestion
(c) Excretion
(d) Respiration

Q30. A sum of money invested at a certain rate of interest compounded annually amounts to Rs. 729 in 4 years and Rs. 1,331 in 7 years. Find the annual rate of interest.

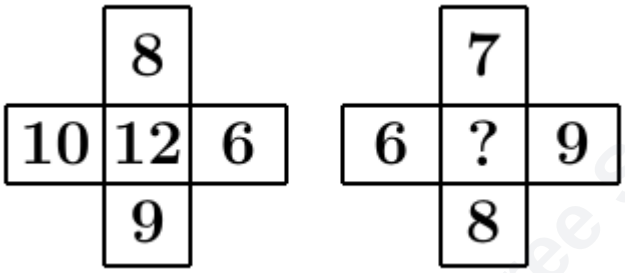
(a) 22 2/9 %
(b) 17 2/7 %
(c) 23 2/9 %
(d) 20%

Q31. Find the value of (0.00314)(0.0393)(0.0001).

(a) (0.0314)(0.00393)(0.00001)
(b) (0.00314)(0.00393)(0.0001)
(c) (0.0314)(0.393)(0.0001)
(d) (0.314)(0.00393)(0.00001)

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Q32. Study the given pattern carefully and select the number that can replace the question mark (?) in the second figure.



(a) 6
(b) 12
(c) 2
(d) 20

Q33. If X is a least number with which you multiply 588 so that the product becomes a perfect square, then the value of X is _____.

(a) 2
(b) 3
(c) 1
(d) 5

Q34. Which of the following articles of the Indian Constitution deals with the protection of the interests of minorities?

(a) Article 29
(b) Article 20
(c) Article 21A
(d) Article 24

Q35. The LCM of two natural numbers is 1326 and their HCF is 3. If the difference of the numbers is 27, then the sum of the numbers is _____.

(a) 129
(b) 125
(c) 140
(d) 117

Q36. If $x = - 102 - 3[-2\{21 + 16 \div (20 \div 5) - 3 \times 2^2\}] - 11$, then what is the value of x?

(a) -35
(b) 35
(c) 17
(d) 24

Q37. In which of the following states, India's only Naval Aviation Museum is located?

(a) Odisha
(b) Goa
(c) Gujarat
(d) Andhra Pradesh

Q38. Who became the first player in the world to hit 500 sixes in international cricket?

(a) Virat Kohli
(b) Rohit Sharma
(c) Chris Gayle
(d) MS Dhoni

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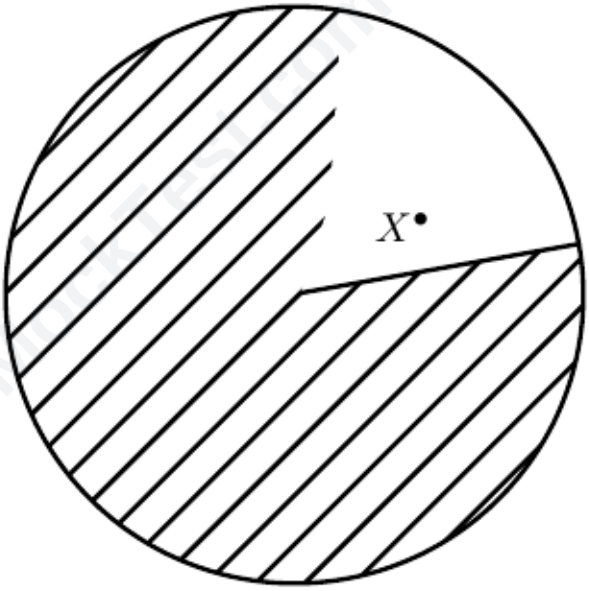
Q39. What is the ascending order of the fractions 4/7, 5/6, 2/3 and 7/8 ?

(a) 4/7, 5/6, 2/3,7/8
(b) 2/3, 5/6, 4/7,7/8
(c) 2/3, 5/6,7/8, 4/7
(d) 4/7, 2/3, 5/6,7/8

Q40. If $a\cos\theta + b\sin\theta = 5$ and $b\cos\theta - a\sin\theta = 3$, then the relation between a and b is _____.

(a) $1/(a^2) + 1/(b^2) = 2$
(b) $a^2 + b^2 = 34$
(c) a2 - b2 = 16
(d) $1/(a^2) - 1/(b^2) = 1$

Q41.



In the figure, if the area of the shaded sector is 70% of the area of the entire circle, then the measure of x° is _____.

(a) 100°
(b) 108°
(c) 72°
(d) 144°

Q42. Prime Minister Rozgar Yojgar (PMRY), to create self-employment opportunities for educated unemployed youth, was implemented in which year?

(a) 1992
(b) 1994
(c) 1995
(d) 1993

Q43. Who was the author of Padmaavat?

(a) Firdausi
(b) Gulbadan Begum
(c) Malik Muhammad Jayasi
(d) Abul Fazal

Q44. At a party, the ratio of men to women is 4 : 3. If there are 84 men, then how many women are at the party?

(a) 63
(b) 36
(c) 42
(d) 53

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Q45. There are five students A, B, C, D and E, sitting in a row facing towards the north. C is sitting exactly in the middle of the row. E is sitting to the immediate right and to the immediate left of D and C, respectively. B is not sitting at the extreme end. Who is sitting third to the left of A?

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

Q46. If the HCF and LCM of 12 and x is 3 and 60 respectively, then x is _____.

(a) 3
(b) 15
(c) 5
(d) 60

Q47. In which state of India is Namdroling Monastery located?

(a) Himachal Pradesh
(b) Karnataka
(c) Andhra Pradesh
(d) Sikkim

Q48. Which of the following is described as the soul of the Constitution of India?

(a) Lok Sabha
(b) Rajya Sabha
(c) Directive Principles of State Policy
(d) Fundamental Rights

Q49. MS Swaminathan is:

(a) an agricultural scientist
(b) a journalist
(c) an ecologist
(d) an ornithologist

Q50. A spherical ball of 12 cm diameter is melted and cast into a cone, the base of which has a diameter of 8 cm. What is the height of the cone?

(a) 54 cm
(b) 36 cm
(c) 48 cm
(d) 42 cm

Q51. The sum of the ages of father and son is 56 years. 7 years ago the father's age was 5 times the age of the son. What are the present ages of father and son respectively?

(a) 48, 8 years
(b) 47, 9 years
(c) 42, 14 years
(d) 45, 11 years

Q52. The _____film "Koozhangal" has won the Tiger award at the 50^(th) International Film Festival Rotterdam 2021.

(a) Malayalam
(b) Kannada
(c) Telugu
(d) Tamil

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Q53. Find the value of

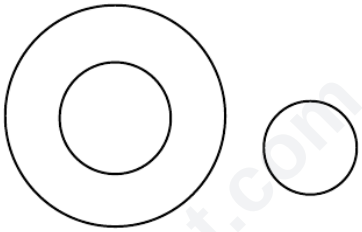
2 + 1/(1+2/(11/4)) +1

(a) 44/13
(b) 42/13
(c) 43/13
(d) 45/13

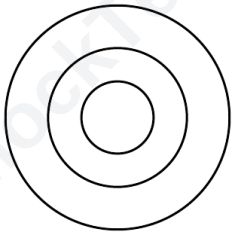
Q54. Select the Venn diagram that best represents the relationship between the following classes.

Dollar, Rupee, Currency

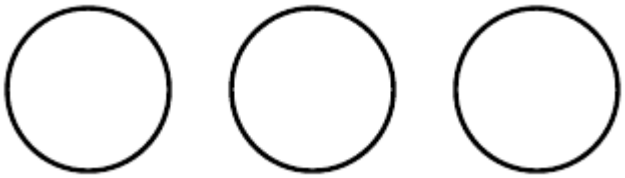
(a)



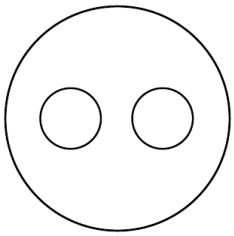
(b)



(c)



(d)



Q55. A rectangular box has sides 3, 4 and 5 cm. What will be the maximum length of a stick that can be placed inside the box?

(a) 5 √(2) cm
(b) 2 √(5) cm
(c) 5 cm
(d) 4 cm

Q56. Rajaji National Park is located in:

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

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Q57. In a certain code language, 'ORTHOPEDICIAN' is written as 'OHTRODEPNAICT'. How will 'ACCOUTERMENTS' be written as in that code language?

(a) CCATUOMRETENS
(b) UOCCARETSTNEM
(c) CTNEMRETUOCSA
(d) UOCCTRAEEMTNS

Q58. From the top of a 72 meter high building the angle of depression of the top and bottom of a temple are observed to be 30º and 60º respectively. What is the height of the temple?

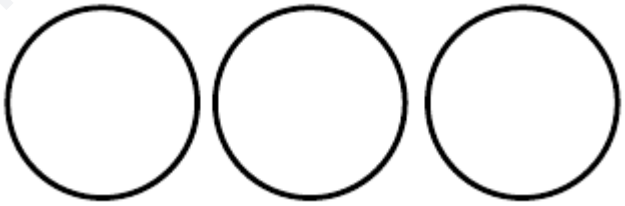
(a) 48 m
(b) 84 m
(c) 54 m
(d) 36 m

Q59. The plants/trees of which of the following forests have their roots submerged under water?

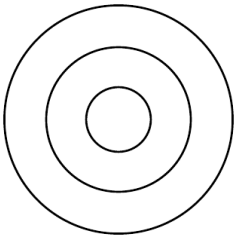
(a) Mangrove forests
(b) Pine forests
(c) Tropical deciduous forests
(d) The thorn forests and scrubs

Q60. Select the Venn diagram that best represents the relationship between the following classes:
Strolling, Walking, Movement

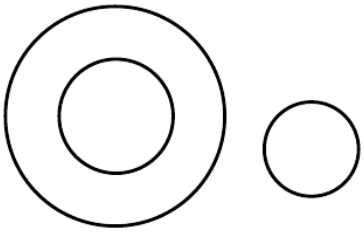
(a)



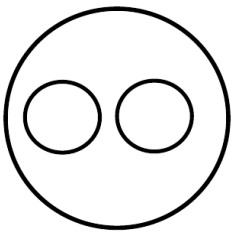
(b)



(c)



(d)



Q61. In an examination, it is required to get 33% of the maximum marks to pass. A student got 130 marks and was declared failed by 35 marks. The maximum marks for the exam is _____.

(a) 500
(b) 300
(c) 600
(d) 550

Q62. A man drives 300 km from A to B in 3 hours 20 minutes. He returns the same distance in 4 hours 10 minutes. The average speed from A to B exceeds the average speed for the entire trip by _____ km/hr.

(a) 9
(b) 5
(c) 8
(d) 10

Q63. Which nuclear power reactor is located in Gujarat?

(a) Narora
(b) Tarapur
(c) Rana Pratap Sagar
(d) Kakrapar

Q64. The correct full form of ISCII from the below is:

(a) International Standard Code for Information Interchange
(b) Indian Standard Code for Information Interchange
(c) Indian Standard Code for International Interaction
(d) International Standard Code for Indian Interaction

Q65. Council of Ministers is collectively responsible to the:

(a) President
(b) Prime Ministe
(c) Lok Sabha
(d) Rajya Sabha

Q66. Four words have been given, out of which three are alike in some way and one is odd. Choose the odd word.

(a) Stare
(b) Jump
(c) Run
(d) Dance

Q67. Towards the close of the summer season, the pre-monsoon showers are common, especially, in Kerala and Karnataka, which are often referred to as:

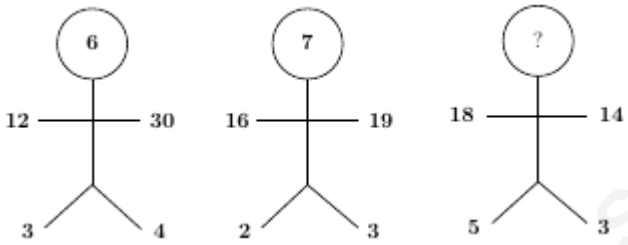
(a) Kaal Baisakhi
(b) Western depressions
(c) Mango showers
(d) Jet streams

Q68. Who has been crowned as the winner of VLCC Femina Miss India World 2020?

(a) Suman Ratan Singh Rao
(b) Manya Singh
(c) Manika Sheokand
(d) Manasa Varanasi

Q69. Study the given pattern carefully and select the number that can replace the question mark (?) in the third figure.

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(a) 5
(b) 7
(c) 4
(d) 2

Q70. The area of a circle is equal to the area of square. What is the ratio of the circumference of the circle to the perimeter of the square?
(a) π : 2
(b) 2: √(π)
(c) √(π) : 2
(d) √(2)π : 1

Q71. Select the letter-cluster from the given options that is similar to the letter-cluster given below:
DW, GT, LO, HS
(a) PW
(b) AT
(c) KP
(d) CT

Q72. Which of the following National Parks is an UNESCO world heritage site?
(a) Jim Corbett National Park
(b) Kaziranga National Park
(c) Dudhwa National Park
(d) Periyar National Park

Q73. The median of observations k - 3 over 2, k + 2, k - 1, k + 4, k + 1 over 2, k - 3, k + 41 over 2 is _____.
(a) k + 1over2
(b) k - 3over2
(c) k + 2
(d) k - 1

Q74. Which part of a Hindu temple incorporates space for large number of worshippers?
(a) Garbhagriha
(b) Mandapa
(c) Shikhar
(d) Vimana

Q75. 9 over 13 of a number is 54. What is 7 over 13 of the same number?
(a) 78
(b) 91
(c) 42
(d) 84

Q76. Of the given three questions, the first two are solved on the basis of a certain system, where the function of diamondsuit and heartsuit remains the same. On the same basis, what does the question mark (?) stand for in the third equation?
1. A heartsuit B = $A^2 \times B \div 2$
2. A diamondsuit B = $A + B^2$

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3. (4 heartsuit 6) diamondsuit 2 = ?

(a) 52
(b) 800
(c) 80
(d) 20

Q77. The ratio of A to B is x : 12 and the ratio of B to C is 4 : y. If the ratio of A to C is 5 : 3, then x : y is _____.

(a) 5 : 3
(b) 5 : 1
(c) 3 : 1
(d) 3 : 5

Q78. 'Track ball' falls under which of the following categories?

(a) Input Device
(b) Output Device
(c) Storage Device
(d) Processing Device

Q79. In which year was the Liberalized Exchange Rate Management System (LERMS) instituted in India?

(a) 1986
(b) 1992
(c) 2001
(d) 2005

Q80. 'HJP' is related to 'KMS' in same way as 'CDA' is related to '_____'.

(a) EFC
(b) FHE
(c) FGD
(d) GHE

Q81. For how many positive integers 'a' it is true that $a^2 \leq 5a$.

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

Q82. Who won the gold in women's badminton singles at the Rio 2016 Summer Olympics Games?

(a) Carolina Marin
(b) Nozomi Okuhara
(c) PV Sindhu
(d) Sania Nehwal

Q83. Select the alphanumeric-cluster that can replace the question mark (?) in the following series.

7D25, 12F16, ?, 37J4, 57L1

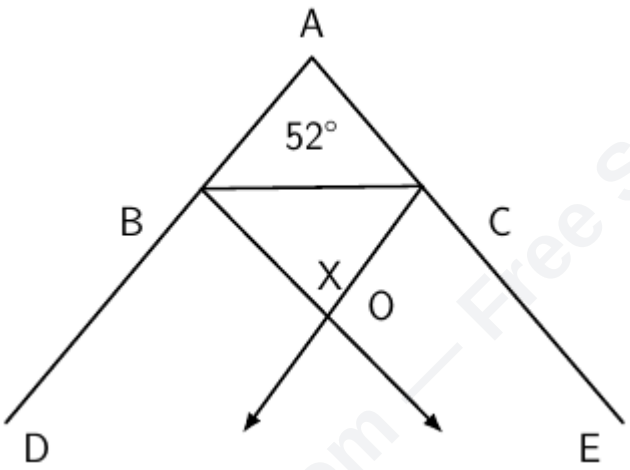
(a) 52I9
(b) 47H8
(c) 22G9
(d) 22H9

Q84. Which is the brightest planet in the night sky?

(a) Mercury
(b) Jupiter
(c) Saturn
(d) Venus

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Q85.



In the above figure, BO and CO are angular bisectors of angle DBC and angle BCE respectively. The measure of x is ____.

(a) 58°
(b) 52°
(c) 54°
(d) 64°

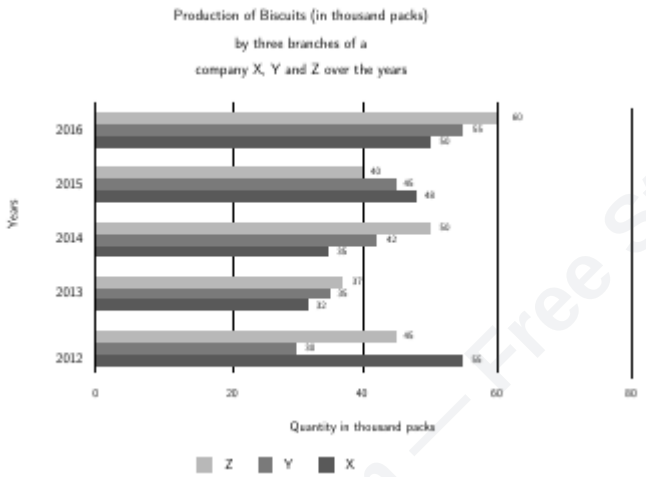
Q86. The following table shows the numbers of students from 5 departments (A, B, C, D and E) of a university who have appeared for campus placement interviews over 5 years (from 2012 to 2016). Answer the given question based on the table.

Dept. →	A	B	C	D	E
Years ↓					
2012	410	300	250	280	440
2013	500	400	280	320	400
2014	450	450	240	260	350
2015	320	500	400	400	380
2016	500	430	540	350	420

The number of students who have appeared for interviews from department D in 2012 is approximately what percentage of the total number of student who have appeared for interviews from all the department together in the same year?

(a) 25.60%
(b) 16.66%
(c) 10.80%
(d) 19%

Q87. The following bar graph shows the production of biscuits (in thousand packs) by three branches X, Y and Z of a company over 5 years (from 2012 to 2016). Answer the given question based on the bar graph.



For branch Y, the percentage increase/decrease in production from the previous year is the highest in which year?

(a) 2012
(b) 2015
(c) 2014
(d) 2016

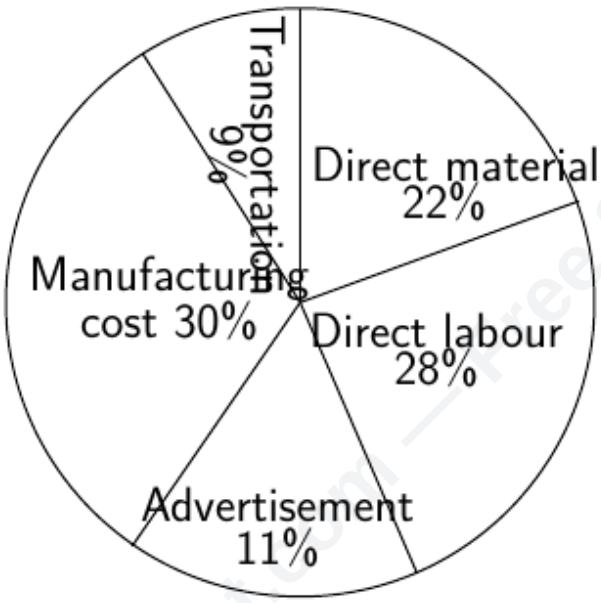
Q88. The following table shows the number of smartphones sold (in thousands) by 4 companies - A, B, C and D during 5 years (from 2014 to 2018). Answer the given question based on the table.

Company	Year				
2014	2015	2016	2017	2018	
A	250	150	275	255	310
B	80	60	55	85	75
C	58	64	50	60	55
D	40	35	52	38	30

Find the ratio of number of smartphones sold by company A in the year 2018 to their total sales during the given period.

(a) 15 : 71
(b) 1 : 4
(c) 31 : 47
(d) 1 : 5

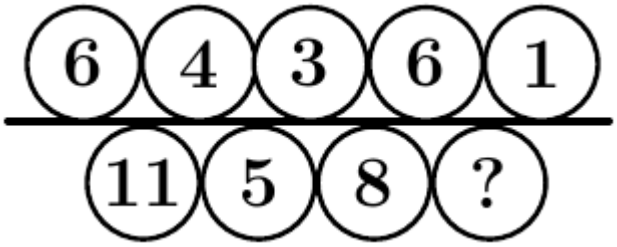
Q89. The following pie chart shows the percentage distribution of the expenditure incurred in manufacturing one smartboard. Answer the given question based on the pie chart.



The price of one smartboard is marked at 30% above the cost price. If the marked price of the smartboard is Rs. 2000, then what is the approximate manufacturing cost?

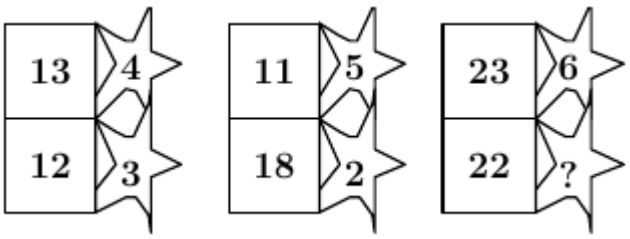
(a) Rs. 275
(b) Rs. 338
(c) Rs. 461
(d) Rs. 169

Q90. Study the given pattern and select the number that can replace the question mark (?) in it.



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

Q91. Study the given pattern carefully and select the number that can replace the question mark (?) in the third figure.



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

Q92. Guava is the only uncle of Grape. Mango is the mother of Apple. Kiwi is Apple's paternal uncle. Banana and Grape are the children of Kiwi. Banana's mothe, Orange, is the only child of her parents. How is Guava related to Apple?

(a) Brother
(b) Maternal uncle
(c) Father
(d) Paternal uncle

Q93. Select the number that can replace the question mark (?) in the following series.

98, 126, 154, 182, 210, ?

(a) 234
(b) 236
(c) 225
(d) 238

Q94. In a certain code language, 'HGLIN' is decoded as 'STORM'. How will 'QVZM' be decoded using the same coding language?

(a) JEAN
(b) NOSE
(c) PINE
(d) ROPE

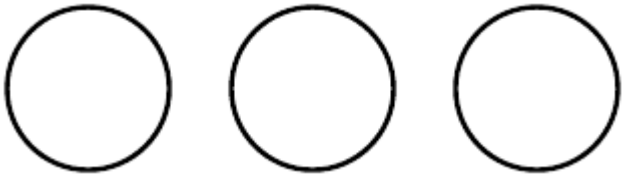
Q95. 'Doctor' is related to 'Hospital' in the way as 'Priest' is related to '_____'.

(a) Prayer
(b) Temple
(c) Ritual
(d) Sacrifice

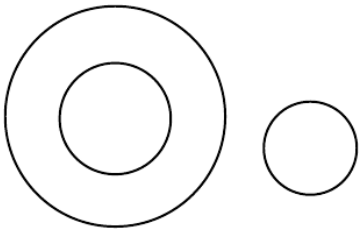
Q96. Select the Venn diagram that best represents the relationship between the following classes.

Music, Dance, Sound.

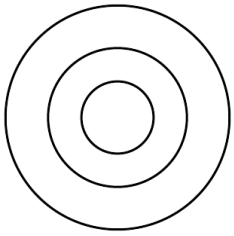
(a)



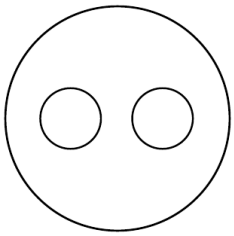
(b)



(c)



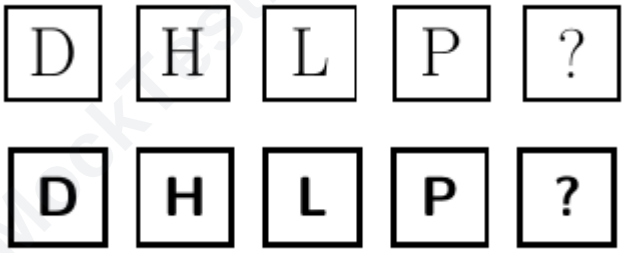
(d)



Q97. If the price of Bitcoin increases at the the rate of one dollar every 20 seconds, then by how many dollars does the price of Bitcoin increase in half an hour?

(a) $80
(b) $10
(c) $90
(d) $50

Q98. Study the given pattarn and select the letter that can replace the question mark (?) in it.



(a) T
(b) W
(c) U
(d) S

Q99. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

1. All earrings are blades.

2. Some guitars are blades.

Conclusions:

A. Some earrings are guitars.

B. Some blades are earrings.

(a) Neither conclusion A nor B follows.
(b) Both conclusions A and B follow.
(c) Only conclusion B follows.
(d) Only conclusion A follows.

Q100. Read the given statement and possible courses of action carefully and tell which of the following courses of action logically follows the statement?

Statement:

The import of goods by country XYZ is much more than the export of goods.

Possible courses of action:

A. The government should explore the resources of the country and use them for export.

B. The government should reduce the imports of the country by initiating schemes and actions to produce the imported goods domestically.

(a) Both course of action A and course of action B follow.
(b) Neither course of action A nor course of action B follows.

(c) Only course of action B follows.
(d) Only course of action A follows.

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (d) 19^(th)April 1975

The correct answer is 19th April 1975

Key Points

• Aryabhata was the first Indian satellite launched on 19 April 1975.
• It was named after Indian Mathematician and astronomer Aryabhata.
• It was built ISRO and launched with Russian rocket launch vehicle Kosmos-3M

Important Points

• ISRO - Indian Space Research Organisation, Indian space agency develop Indian space programs.
• Founded - 1969
• Headquarter - Bangalore
• Chairman - K. Sivan

Additional Information

• On 18 may 1974, first successful nuclear bomb test was performed by India at Pokhran, an Indian Army base in Rajasthan.
• The code for this mission was Smiling Buddha and it is also known as Pokhran-I test.
• Indira Gandhi was Prime minister at that time.
• Pokhran-II test was a series of five nuclear bomb test explosions in 1998 at Pokhran, an Indian Army base in Rajasthan.
• The code for this mission was Operation Shakti–98 and five bombs were named as Shakti– i to iv.
• Atal Bihari Vajpayee was Prime minister at that time.

Q2. Answer: (d) 9

Given:

Arithmetic mean of a set of 16 observations = 12

8 is subtracted from each of six of these observations

Formula Used:

New Arithmetic Mean = (Sum of all observations) / (Number of observations)

Calculation:

Let the sum of the 16 observations be S.

Arithmetic mean = S / 16 = 12

=> S = 12 × 16

=> S = 192

When 8 is subtracted from each of six observations, the total subtraction is 8 × 6 = 48.

New sum = 192 - 48

New sum = 144
New Arithmetic Mean = 144 / 16
New Arithmetic Mean = 9
The new arithmetic mean is 9.

Q3. Answer: (a) 104

The correct answer is 104
Key Points
• The PSLV-C37 successfully carried and deployed a record 104 satellites into sun-synchronous orbits:
• Launch date: February 15, 2017
• Launch site: Satish Dhawan Space Centre, Sriharikota, Andhra Pradesh
• Payload: 104 satellites, including a 714-kilogram main satellite and 103 smaller "nanosatellites"
• Record: Broke the previous record of 37 satellites launched by a Russian Dnepr rocket in 2014
• Challenges: Ensuring adequate separation between the satellites during orbital injection and orbital life
• Data sets: Could be used for urban planning, master plan preparation, and detailed geospatial data preparation
• Upper stage: Re-entered the Earth's atmosphere on October 6, 2024

Q4. Answer: (a) food processing

The correct answer is food processing
Key Points
• The Pradhan Mantri Kisan Sampada Yojana (PMKSY) is a flagship program that aims to boost investment in food processing:
• Objective
• The PMKSY is a scheme that aims to develop modern infrastructure and common facilities to encourage food processing units.
• It also aims to create an efficient supply chain from the farm to the retail outlet.
• Implementation
• The Ministry of Food Processing Industries (MoFPI) has been implementing the PMKSY since 2017-18.
• The scheme provides financial support in the form of grants-in-aid or subsidies to set up food processing projects.
• Component schemes
• The PMKSY has several component schemes, including:
• Mega Food Parks
• Integrated Cold Chain and Value Addition Infrastructure
• Creation of Infrastructure for Agro Processing Clusters
• Creation/Expansion of Food Processing and Preservation Capacities
• Operation Greens

Q5. Answer: (d) Brazil

The correct answer is Brazil
Key Points
• Brazil is a member of BRICS:
• BRICS stands for Brazil, Russia, India, China, and South Africa.
• Membership
• In 2024, Egypt, Ethiopia, Iran, and the United Arab Emirates joined BRICS, making it a total of eight member countries.
• Purpose
• BRICS is an informal group of emerging economies that aims to increase its influence in the global order.
• Significance
• Together, BRICS countries account for about 40% of the world's population and 30% of its GDP.
• History
• The acronym "BRICS" was created in 2001 by Goldman Sachs economist Jim O'Neill.

Q6. Answer: (b) Domestic Train

The logic followed here is:

Express Train	Type of train

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Domestic Train	Trains within a country
Mail Train	Type of train
Passenger Train	Type of train

Express Train, Mail Train, Passenger Train all are specific types of trains,

Whereas,

Domestic Train refers to a train operating within a country and is not a specific type of train.

Hence, the correct answer is "Domestic Train".

Q7. Answer: (d) Basel

The correct answer is Basel

Key Points

• The headquarters of the Bank for International Settlements (BIS) is located in Basel, Switzerland:

• The BIS is the world's oldest international financial institution, established in 1930.

• The BIS has two representative offices, in Hong Kong SAR and Mexico City, and Innovation Hub Centres around the world.

• The BIS headquarters is located in the BIS-Tower, a 69.5-meter-high administrative tower designed by Martin Burckhardt.

• The tower was built between 1972 and 1977 and was the third tallest building in Basel until 2003.

• The BIS is planning to develop its headquarters site in Basel.

• The BIS was created at the Hague Conference to address German war reparation payments from the 1919 Treaty of Versailles.

• The BIS's neutral country status and good railway connections were key factors in the decision to locate its headquarters in Base

Q8. Answer: (c) Ernest Mackay

The correct answer is Ernest Mackay

Key Points

• The book "Early Indus Civilisation" (1948) was written by Ernest Mackay.

• Ernest Mackay was a prominent archaeologist who made significant contributions to the study of the Indus Valley Civilization.

• His book "Early Indus Civilisation" (1948) compiles his observations and analyses based on archaeological excavations he conducted and reviewed, primarily at sites like Mohenjo-daro and other Indus Valley settlements

Additional Information

• list of books by the other options:

• G.F. Dales

• "Excavations at Mohenjo-daro" (with Robert H. Brunswig): Focuses on excavations and maritime trade in the Indus Valley.

• "The Mythical Massacre at Mohenjo-daro": Challenges earlier interpretations of skeletal remains at the site, particularly those suggesting a violent end to the civilization.

• John Marshall

• "Mohenjo-daro and the Indus Civilization" (1931): A comprehensive report on the excavations at Mohenjo-daro and Harappa, including artifacts, architecture, and urban planning.

• "The Buddhist Art of Gandhara": Explores the art and architecture of Gandhara, reflecting his broader archaeological expertise beyond the Indus Valley.

• R.E.M. Wheeler

• "The Indus Civilization": Discusses the chronology, urban planning, and decline of the Indus Valley Civilization.

• "Archaeology from the Earth": A guide to archaeological methods and their application in fieldwork.

• "Civilizations of the Indus Valley and Beyond": Examines the cultural and historical significance of the Indus Valley and neighboring regions.

Q9. Answer: (d) 31/33 %

Given:

3/11 1/121

Formula Used:

Percentage = (Part / Whole) × 100

Calculation:

Whole = 3/11 Part = 1/121

Percentage = (1/121 / 3/11) × 100

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=> 1/121 × 11/3 × 100

=> (1 × 11 × 100) / (121 × 3)

=> 1100 / 363

=> 31/33 %

The correct option is 4.

Q10. Answer: (b) Monitor

The correct answer is Monitor

Key Points

• A monitor is an output device.

• An output device is a piece of computer hardware that receives data from the system and converts it into a human-readable form.

• Some other examples of output devices include:

• Printer, Projector, Plotter, Speaker, Headphones, and Sound card.

• In contrast, a keyboard, mouse, scanner, digital camera, and joystick are examples of input devices.

Q11. Answer: (c) Mysore

The correct answer is Mysore

Key Points

• Haidar Ali was the ruler of the Kingdom of Mysore in southern India from 1761 until his death in 1782

• Haidar Ali was a prominent military leader during the First and Second Anglo-Mysore Wars.

• He ruled Mysore from 1761 to 1782.

• Haidar Ali was the father of Tipu Sultan, who succeeded him and ruled Mysore from 1782 to 1799.

• He employed French workmen to develop his artillery and arsenal, strengthening his military capabilities.

• Haidar Ali expanded Mysore's borders by defeating the Maratha Empire and the Nizam of Hyderabad.

• Haidar Ali was born Hyder Naik and became the de facto ruler of Mysore after rising to the post of Dalavayi (commander-in-chief) to Krishnaraja Wodeyar II.

• He was known for his military strength and creative strategies and was one of the few local rulers to effectively blunt the military advances of the British East India Company.

Q12. Answer: (c) Rs. 250

Given:

Principal (P) = Rs. 5,000

Compound Interest (CI) = Rs. 253.125

Time (T) = 2 years

Rate of Interest (R) = ?

Calculation:

Step 1: Calculate the rate of interest for compound interest.

Formula for compound interest:

$CI = P \times [(1 + R/100)^n - 1]$, where n is the number of years.

Substitute the values:

$253.125 = 5000 \times [(1 + R/100)^2 - 1]$

Divide by 5000:

$(1 + R/100)^2 - 1 = 253.125 \div 5000 = 0.050625$

Add 1 to both sides:

$(1 + R/100)^2 = 1.050625$

Take the square root:

$1 + R/100 = \sqrt{1.050625} \approx 1.025$

Solve for R:

$R = (1.025 - 1) \times 100 = 2.5\%$

Step 2: Calculate simple interest for the same sum, time, and rate.

Formula for simple interest:

$SI = (P \times R \times T) \div 100$

Substitute the values:

SI = (5000 × 2.5 × 2) ÷ 100 = Rs. 250

Final Answer:

The interest for the same sum and duration at simple interest would be Rs. 250.

Q13. Answer: (b) Satpura

The correct answer is Satpura

Key Points

• The Tapi (or Tapti) River originates from the Satpura range, specifically from the Multai region in Madhya Pradesh.
• It flows westward, traversing through Madhya Pradesh, Maharashtra, and Gujarat, before emptying into the Arabian Sea.
• The river travels a total length of about 724 kilometres.
• It flows through three states:
• Madhya Pradesh: The river begins here and flows westward.
• Maharashtra: It forms a fertile valley, supporting agriculture in this region.
• Gujarat: It enters the state and finally drains into the Arabian Sea near the city of Surat.
• The river hosts projects like the Ukai Dam in Gujarat, which provides water for irrigation and hydroelectric power.

Additional Information

• Brahmagiri
• Brahmagiri hills are in the Western Ghats in Maharashtra.
• It is the source of the Godavari River, which is one of the largest rivers in India and flows eastward.
• Mansarovar Lake
• Lake Mansarovar is a sacred freshwater lake located near Mount Kailash in Tibet.
• It is the source of major rivers such as:
• Indus River: Flows westward into Pakistan.
• Sutlej River: A tributary of the Indus, flowing through India and Pakistan.
• Brahmaputra River: Flows eastward through India and Bangladesh.
• Amarkantak
• Amarkantak is a plateau in Madhya Pradesh and is considered a sacred pilgrimage site.
• It is the origin of:
• Narmada River: A major westward-flowing river, like Tapi.
• Son River: A tributary of the Ganges, flowing eastward.

Q14. Answer: (a) Three

The correct answer is Three

Key Points

• Sir Isaac Newton described three laws of motion in his 1687 book Principia Mathematica Philosophiae Naturalis:
• First law
• An object will remain at rest or in motion unless acted upon by another force.
• This law is also known as the law of inertia or Galileo's principle.
• Second law
• The net force on an object is equal to the object's acceleration multiplied by its mass.
• Third law
• If two objects exert forces on each other, the forces have the same magnitude but opposite directions.
• Newton's laws of motion are used to describe the relationship between the motion of an object and the forces acting on it.
• They are used in many real-world applications, including simulating car collisions, navigating spacecraft, and playing basketball.

Q15. Answer: (d) Subhas Chandra Bose

The correct answer is Subhas Chandra Bose

Key Points

• Subhas Chandra Bose gave the slogan "Dilli Chalo" during the Indian freedom struggle.
• He used this slogan to motivate the Indian National Army (INA) in 1944 when the INA began its military campaign against Burma.
• Bose was a prominent leader of the Indian National Congress (INC) and was known for his militant approach towards achieving

independence.

• He was also the President of the INC for two terms, in 1938 and 1939.

• Bose founded the Forward Bloc in 1939, which advocated for complete independence for India.

Additional Information

• Jawaharlal Nehru

• Role: First Prime Minister of Independent India (1947–1964).

• Contribution:

• Played a central role in the Indian independence movement, advocating for self-rule.

• Championed the causes of modernization, industrialization, and scientific progress for a newly independent India.

• Promoted a secular and democratic vision for India, focusing on unity amidst diversity.

• He articulated his vision of a modern India through initiatives like the Five-Year Plans and established institutions of higher education such as IITs and AIIMS.

• Books: The Discovery of India, Glimpses of World History.

• Muhammad Ali Jinnah

• Role: Founder of Pakistan; first Governor-General of Pakistan (1947–1948).

• Contribution:

• Initially part of the Indian National Congress, Jinnah later became the leader of the All-India Muslim League.

• Advocated for the rights of Muslims in India and eventually called for a separate nation, Pakistan, through the Two-Nation Theory.

• Instrumental in the Pakistan Resolution (1940), which formally demanded the creation of Pakistan.

• Known as Quaid-e-Azam (Great Leader) in Pakistan, he worked towards creating a separate state for Muslims, emphasizing the need for constitutional rights and governance.

• Mahatma Gandhi

• Role: Leader of the Indian independence movement and advocate of nonviolent resistance.

• Contribution:

• Popularized Satyagraha (nonviolent resistance) and Ahimsa (nonviolence) as powerful tools against British rule.

• Led significant campaigns like the Non-Cooperation Movement (1920), Dandi Salt March (1930), and Quit India Movement (1942).

• Championed the causes of social justice, including the upliftment of Dalits (whom he referred to as Harijans), and promoted self-reliance through the Swadeshi movement.

• His philosophy of simplicity and truth inspired civil rights movements worldwide, including those led by Martin Luther King Jr. and Nelson Mandela.

• Books: Autobiography - The Story of My Experiments with Truth.

Q16. Answer: (b) Coasts influenced by tides

The correct answer is Coastal areas.

Key Points

• Mangrove forests are found in the areas of coasts influenced by tides.

• These forests are grown in saline soil.

• Dense mangroves are the common varieties with roots of plants submerged underwater.

• The deltas of Ganga, Mahanadi, Krishna, Godavari, and Kaveri are covered with such vegetation.

• In the Ganga-Bhramahputra delta, Sundari trees are found which provide hard timber.

• Palm, Coconut, keora, agar is grown here.

• Royal Bengal Tiger is the most famous animal found here.

• The dense roots of mangroves help to bind and build soils.

• The above-ground roots slow down water flows, encourage the deposition of sediments, and reduce erosion.

• The word mangrove can be described as a single plant or it can refer to a whole community of plants.

• They are halophytes (salt-loving). Most plants cannot survive in salty conditions.

Additional Information

• Upper Himalayan Region

• This refers to the higher elevations of the Himalayas, extending across northern India, Nepal, Bhutan, and parts of Tibet.

• Features:

• Snow-capped peaks and glaciers.

• The Himalayan ranges in this region are the source of several major rivers like the Indus, Ganges, and Brahmaputra.
• Home to biodiversity, with species such as snow leopards, red pandas, and various mountain birds.
• The Himalayas act as a natural barrier separating India from China.
• Famous for trekking and mountaineering, with notable peaks like Mount Everest and Kanchenjunga.
• Vindhya Mountain Region
• The Vindhya Range runs across northern India, from the Aravalli Range in the west to the Chhota Nagpur Plateau in the east.
• Features:
• The Vindhya Mountains are primarily composed of sedimentary rocks, with plateaus, ridges, and valleys.
• Known for the Kaimur Hills and Satpura Range as subranges of the Vindhyas.
• The Vindhyas are a cultural and geographical divide between northern and southern India.
• Rich in mineral resources, particularly coal and limestone.
• The region is also home to several historical sites and temples, such as those in Kanha and Kailadevi.
• Thar Desert Region
• The Thar Desert spans parts of Rajasthan in India, extending into Pakistan.
• Features:
• Known for arid conditions, sand dunes, and extreme temperatures.
• The region experiences low rainfall and is characterized by scant vegetation like cactus and drought-resistant plants.
• The Thar Desert is home to a range of unique wildlife, such as the Indian wild ass and desert fox.
• Major towns like Jaisalmer and Barmer are located here, and it is also rich in mineral deposits.
• The desert is a vital area for camel breeding and desert tourism.

Q17. Answer: (a) Mother

Family Chart:

Given: Cherry and Kiwi are sisters whose parents are Orange and Melon. Melon is the brother of Grape, who is married to Mango.

So, Orange is 'Mother' of Cherry.

Hence, the correct answer is "Mother".

Q18. Answer: (b) Both actions A and B follow.

Given:

Statement: The people who were rehabilitated due to the construction of government aluminium mines are protesting the poor living conditions of their new habitat.

Course of Action:

I. The government must send a team to these people to inquire about their complaints. - True (Because, This will allow the government to understand the specific issues and concerns that the people are facing in their new habitat).

II. The new habitat of these people must be inspected for healthy and safe living conditions. - True (Because, inspect the new habitat to assess whether it provides healthy and safe living conditions for the people who were rehabilitated. This inspection should be done based on the feedback and complaints gathered in the first step.)

So, Both I and II follow.

Hence, the correct answer is "Option 2".

Q19. Answer: (d) Bamboo

The correct answer is Bamboo

Key Points

• Due to its vast utility and economic importance, bamboo is often termed as Green Gold.

• Bamboo is an incredibly versatile plant, used for a wide variety of purposes including construction (building materials), furniture, paper, textiles, and even as a food source in some cultures.

• It grows rapidly and is highly sustainable, playing a key role in reducing carbon dioxide levels and promoting soil conservation.

• Bamboo holds cultural importance in many regions of Asia, where it's used in traditional crafts, tools, and even as a symbol of strength and resilience.

• Bamboo is one of the fastest-growing plants on earth, making it an eco-friendly resource for industries.

Q20. Answer: (d) Lord Lytton

The correct answer is Lord Lytton

Key Points

• Lord Lytton, the Viceroy of India from 1876 to 1880, proposed the Vernacular Press Act of 1878:

• Lord Lytton

• Known for

• Proposed the Vernacular Press Act of 1878

• Other works

• Royal Titles Act 1876, reduced the maximum age for ICS to 19, Indian Arms Act 1878

• The Vernacular Press Act was intended to limit the freedom of the Indian-language press and prevent criticism of British policies.

• The act allowed the government to: Censor reports and editorials, Track vernacular newspapers, Warn newspapers that published seditious reports, Collect security deposits from vernacular newspapers, and Confiscate the printing press of vernacular newspapers that published seditious reports.

• The act was repealed in 1881 by Lytton's successor, Lord Ripon.

• The act was a catalyst for India's growing independence movement and was one of the reasons for the Indian Association's strong criticism of the act.

• The Indian Association is considered a precursor to the Indian National Congress

Additional Information

• Lord Mayo (1869–1872)

• Lord Mayo was the Viceroy of India from 1869 to 1872.

• His notable achievements include conducting the first census of India in 1872, promoting financial decentralization, establishing the Mayo College in Ajmer, and initiating the Statistical Survey of India.

• Lord Lawrence (1864–1869)

• Lord Lawrence served as the Viceroy of India from 1864 to 1869.

• He is remembered for establishing High Courts in Calcutta, Madras, and Bombay, and for opening telegraphic communication with Europe.

Important Points

• Other notable Viceroys of India include

• Lord Northbrook

• Introduced the Universal Marriage Act of 1872 and allowed intercaste marriage

• Lord Dufferin

• Fought the Third Anglo-Burmese War and the Indian National Congress (INC) was formed during his tenure

• Lord Curzon

• Partitioned Bengal in 1905 and introduced the Indian Universities Act in 1904

Q21. Answer: (d) 51/3

Given:

A can do a piece of work alone in 16 days.

B can do the work alone in 12 days.

Together with C, they can complete the work in 3 days.

Formula Used:

Work rate = 1 / Time taken

Combined work rate = Work rate of A + Work rate of B + Work rate of C

Calculation:

Work rate of A = 1 / 16

Work rate of B = 1 / 12

Combined work rate of A, B, and C = 1 / 3

Let Work rate of C be 1 / x

=> 1 / 16 + 1 / 12 + 1 / x = 1 / 3

To solve, find a common denominator (48):

=> 3 / 48 + 4 / 48 + 1 / x = 1 / 3

=> (3 + 4) / 48 + 1 / x = 1 / 3

=> 7 / 48 + 1 / x = 1 / 3

Subtract 7 / 48 from both sides:

=> 1 / x = 1 / 3 - 7 / 48

Convert 1 / 3 to a fraction with a denominator of 48:

=> 1 / 3 = 16 / 48

=> 1 / x = 16 / 48 - 7 / 48

=> 1 / x = 9 / 48

=> x = 48 / 9

=> x = 16 / 3

=> x = 5¹/3

The correct answer is option 4: C alone can do the work in 5¹/3 days.

Q22. Answer: (d) Dholavira

The correct answer is Dholavira

Key Points

• The Indus Valley Civilization site of Dholavira in Gujarat, India has evidence of reservoirs:

• Water storage tanks and step wells: Dholavira had a series of water storage tanks and step wells.

• Rainwater harvesting system: Dholavira had a sophisticated rainwater harvesting system that extended from the city walls.

• Water conservation system: Dholavira had one of the world's earliest water conservation systems.

• Reservoir irrigation: Dholavira's agriculture and sustenance were based on water reservoirs. The reservoirs likely received water from the branches of the ancient Saraswati river.

• Unique water management system: Dholavira's water management system has been called "unique".

• Dholavira is one of the two largest Harappan sites in India and the fifth largest in the subcontinent.

• The Archaeological Survey of India (ASI) discovered the site in 1967.

• In 2021, UNESCO included Dholavira in its list of World Heritage Sites.

Q23. Answer: (c) 3825

Calculation:

We need to calculate:

(0.625 × 0.729 × 2.89) ÷ (0.0081 × 0.025 × 1.7)

Converted the decimals into integer form with appropriate powers of 10.

Now, let's simplify the expression:

(625 × 729 × 289) × 10^-^8 ÷ (81 × 25 × 17) × 10^-^8

Since both the numerator and denominator have the same power of 10 (10^-^8), they cancel each other out.

So, we are left with:

(625 × 729 × 289) ÷ (81 × 25 × 17)

Step 1: Factorization

625 = 25 × 25

729 = 9 × 81

289 = 17 × 17

So, the expression becomes:

(25 × 25 × 9 × 81 × 17 × 17) / (81 × 25 ×17)

Step 2: Cancellation

We can cancel out common factors from the numerator and denominator:

(25 × 25 × 9 × 81 × 17 × 17) / (81 × 25 ×17) = 25 × 9 × 17

Step 3: Multiplication

Now, we can multiply the remaining numbers:

25 × 9 × 17 = 3825

Therefore, the result of the expression is 3825.

Q24. Answer: (d) 10

Let the distance to the destination be D km and the correct time to reach the destination be T hours.

Given:

If speed = 45 km/hr, time taken = T + 10/60 = T + 1/6

If speed = 60 km/hr, time taken = T + 5/60 = T + 1/12

Using the formula for time:

Time = Distance ÷ Speed

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Step 1: Write equations for distance:

At 45 km/hr: D = 45 × (T + 1/6)

At 60 km/hr: D = 60 × (T + 1/12)

Step 2: Equate the two expressions for D:

45 × (T + 1/6) = 60 × (T + 1/12)

Simplify:

45T + 45/6 = 60T + 60/12

45T + 7.5 = 60T + 5

15T = 2.5

T = 2.5 ÷ 15 = 1/6 hours

Step 3: Convert T to minutes:

T = 1/6 × 60 = 10 minutes

Final Answer:

The person should complete the journey in exactly 10 minutes.

Q25. Answer: (d) melamine

The correct answer is Melamine

Key Points

• Melamine is a type of plastic that is known for its flame-resistant properties.

• It does not catch fire easily and can withstand high temperatures, making it suitable for use in fire-resistant materials.

• The uniforms of firemen are coated with melamine plastic to provide protection against flames and heat during firefighting operations.

Additional Information

• Rayon: A synthetic fiber used in textiles but not flame-resistant.

• Acrylic: Another synthetic fiber, often used for sweaters and blankets, but it is not fire-resistant.

• Nylon: A strong and elastic synthetic fiber, but it melts when exposed to high heat and is not suitable for fire-resistant applications.

Q26. Answer: (d) Odisha

The correct answer is Odisha

Key Points

• The largest coastal saltwater lake in India is Chilika Lake, which is located in the state of Odisha:

• Chilika Lake is located in the Puri, Khurda, and Ganjam districts of Odisha, at the mouth of the Bay of Bengal.

• Size

• Chilika Lake is the largest brackish water lake in Asia and the second largest coastal lagoon in the world.

• Importance

• Chilika Lake is a Ramsar site and a significant habitat for a variety of flora and fauna, including migratory birds.

• It's also an important ecosystem that supports local communities through fishing and tourism.

Q27. Answer: (d) Mantle

The correct answer is Mantle

Key Points

• The main source of magma is the upper part of the mantle, particularly the asthenosphere:

• Asthenosphere

• This layer is located in the upper mantle, beneath the lithosphere, and is made up of semi-fused and solid materials.

• It's considered the main source of magma that reaches the surface during volcanic eruptions.

• Magma

• Magma is a mixture of molten or semi-molten rock, volatiles, and solids.

• It's produced when the mantle or crust melts in various tectonic settings, such as continental rift zones, mid-ocean ridges, subduction zones, and hotspots.

• The Earth's core is a major energy source for the planet.

• It stores energy from radioactive decay and core-mantle segregation, and produces heat as the inner core continues to grow.

Additional Information

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• Crust
• The crust is made of solid rock, mostly basalt and granite.
• There are two types of crust: oceanic and continental.
• Oceanic crust is denser and thinner, while continental crust is thicker and less dense.
• Inner core
• The inner core is made of extremely hot metal, mostly iron and nickel, under incredible pressure.
• The pressure is so high that it prevents the iron from melting, making the inner core solid.
• Outer core: The third layer, located about 1,800 miles below the crust

Q28. Answer: (d) 10

Given:
Weight of first variety of rice = 20 kg
Cost per kg of first variety = Rs. 52
Weight of second variety of rice = 60 kg
Cost per kg of second variety = Rs. 36
Selling price of mixed rice = Rs. 44 per kg
Formula Used:
Cost price (CP) of mixed rice = (Total cost of both varieties)/(Total weight)
Profit percentage = ((Selling price (SP) - Cost price (CP))/(Cost price (CP))) × 100
Calculation:
Total cost of first variety = 20 kg × Rs. 52 = Rs. 1040
Total cost of second variety = 60 kg × Rs. 36 = Rs. 2160
Total weight = 20 kg + 60 kg = 80 kg
Total cost of mixed rice = Rs. 1040 + Rs. 2160 = Rs. 3200
Cost price (CP) of mixed rice = (Rs. 3200)/(80 kg)
=> Cost price (CP) of mixed rice = Rs. 40 per kg
Selling price (SP) of mixed rice = Rs. 44 per kg
Profit percentage = ((Rs. 44 - Rs. 40)/(Rs. 40)) × 100
=> Profit percentage = 4/40 × 100
=> Profit percentage = 10%
The correct answer is option 4 (10%).

Q29. Answer: (a) Vaccination

The logic followed here is:

Vaccination	Medical procedure
Digestion	Biological process
Excretion	Biological process
Respiration	Biological process

Digestion, Excretion, and Respiration are all Biological processes,
Whereas,
Vaccination is a Medical procedure.
Hence, the correct answer is "Vaccination".

Q30. Answer: (a) 22 2/9 %

Given:
Amount after 4 years (A4) = Rs. 729
Amount after 7 years (A7) = Rs. 1,331
Time difference (t) = 7 - 4 = 3 years
Formula used:
A = P(1 + r/100)t
Where, A = Amount, P = Principal, r = Rate of interest

Calculations:

Let the principal amount be P and the rate of interest be r% per annum.

From the given information:

729 = P (1 + r/100)4 (1)

1,331 = P (1 + r/100)7 (2)

Dividing equation (2) by equation (1):

=> 1,331 / 729 = (1 + r/100)3

=> (1 + r/100)3 = 1331 / 729

=> (1 + r/100) = (1331 / 729)1/3

=> (1 + r/100) = 11 / 9

=> r/100 = (11/9 - 1)

=> r/100 = 2/9

=> r = (2/9) × 100 = 22.22%

Therefore The annual rate of interest is 22 2/9 %

Q31. Answer: (d) (0.314)(0.00393)(0.00001)

Let's calculate the value of (0.00314)(0.0393)(0.0001).

Comparing this with the given options:

Option 1: (0.0314)(0.00393)(0.00001) - Incorrect, as the decimal places don't match.

Option 2: (0.00314)(0.00393)(0.0001) - Incorrect, as the decimal places don't match.

Option 3: (0.0314)(0.393)(0.0001) - Incorrect, as the decimal places don't match.

Option 4: (0.314)(0.00393)(0.00001) - Correct, as this will give the same number of decimal places as the original calculation.

Therefore, the correct answer is Option 4.

Q32. Answer: (c) 2

The logic followed here is: (Top number × Bottom number) - (Left number × Right number) = Middle number.

Figure 1: (8 × 9) - (10 × 6) = 72 - 60 = 12

Similarly,

Figure 2: (7 × 8) - (6 × 9) = 56- 54 = 2

Hence, the correct answer is "2".

Q33. Answer: (b) 3

Given:

The number is 588.

Formula Used:

To make the product a perfect square, multiply by the smallest number that balances the prime factors to even powers.

Calculation:

Prime factorization of 588:

588 = 2 × 2 × 3 × 7 × 7 = $2^2 \times 3^1 \times 7^2$

To make the product a perfect square, the power of each prime factor should be even.

The power of 2 and 7 is already even.

The power of 3 is odd, so we need one more 3 to make it even.

=> X = 3

Therefore The value of X is 3

The correct answer is 3.

Q34. Answer: (a) Article 29

The correct answer is Article 29

Key Points

• Article 29 of the Indian Constitution protects the interests of minorities by:

• Granting the right to preserve a distinct language, script, or culture to any group of citizens in India

• Prohibiting the denial of admission to any educational institution based on religion, race, caste, or language

• Criminalizing discrimination against a minor culture, language, religion, caste, or race

Additional Information

• Article 20: Protection in Respect of Conviction for Offenses

• Provides protection against arbitrary and oppressive laws related to criminal offences.

• Key provisions:

• Ex post facto laws: No person can be convicted for an act that was not a crime at the time it was committed.

• Double jeopardy: No person shall be prosecuted or punished for the same offence more than once.

• Self-incrimination: No person accused of an offence shall be compelled to be a witness against themselves.

• Article 21A: Right to Education

• Added by the 86th Constitutional Amendment Act, 2002.

• States that the government shall provide free and compulsory education to all children aged 6 to 14 years.

• It is a fundamental right aimed at promoting literacy and education for children.

• Article 24: Prohibition of Employment of Children in Factories

• Prohibits the employment of children below the age of 14 years in any factory, mine, or other hazardous work.

• This is a step towards eliminating child labor and protecting children from exploitation.

Q35. Answer: (a) 129

Given:

LCM of two natural numbers = 1326

HCF of two natural numbers = 3

Difference of the numbers = 27

Formula Used:

Product of two numbers = LCM × HCF

Calculation:

Let the two numbers be a and b.

Given: a - b = 27

Also, a × b = 1326 × 3

=> a × b = 3978

Now, let a = x + 27 and b = x, where x is a natural number.

Therefore, (x + 27) × x = 3978

=> $x^2 + 27x - 3978 = 0$

Solving the quadratic equation:

Using the quadratic formula $x = (-b \pm \sqrt{(b^2 - 4ac)})/2a$

Here, a = 1, b = 27, and c = -3978

=> $x = (-27 \pm \sqrt{(272 - 4 \times 1 \times (-3978))})/(2 \times 1)$

=> $x = (-27 \pm \sqrt{(729 + 15912)})/2$

=> $x = (-27 \pm \sqrt{(16641)})/2$

=> $x = (-27 \pm 129)/2$

We get two values of x :

x = 102/2 = 51 and

x = -156/2 = -78

Since x must be a natural number, we take x = 51.

Therefore, the two numbers are b = x = 51.

Sum of the numbers = 78 + 51 = 129

The sum of the numbers is 129.

Q36. Answer: (a) -35

Given:

$x = -102 - 3[-2\{21 + 16 \div (20 \div 5) - 3 \times 2^2\}] - 11$

Formula used:

Follow the BODMAS rule: Brackets, Orders (powers/roots), Division, Multiplication, Addition, Subtraction.

Calculations:

Start with the innermost bracket:

(20 ÷ 5) = 4
=> 16 ÷ 4 = 4
=> 21 + 4 - 3 × 2^2
2^2 = 4
=> 21 + 4 - 3 × 4
=> 21 + 4 - 12
=> 13
Now substitute back:
-2{13} = -26
=> -3[-26] = 78
Substitute into the main expression:
x = -102 + 78 - 11
=> x = -113 + 78
=> x = -35
Therefore The value of x is -35.

Q37. Answer: (b) Goa

The correct answer is Goa
Key Points
• India's only Naval Aviation Museum is located in Goa:
• The museum is in Bogmalo, about 6 kilometers from Vasco da Gama, in the South Goa District.
• It was established in 1998 to showcase the history, evolution, and significance of the Indian Naval Air Arm.
• The museum has two main parts: an outdoor exhibit and a two-story indoor gallery.
• The museum's exhibits include: Vintage warplanes, Modern helicopters, Uniforms, Artifacts, and Rare photographs.
• The museum is a tribute to the men and women who have kept the seas and shores safe.

Q38. Answer: (c) Chris Gayle

The correct answer is Chris Gayle
Key Points
• Chris Gayle was the first player to hit 500 sixes in international cricket:
• The former West Indies player hit 553 sixes in international cricket.
• He also holds the record for the most sixes in T20 cricket with 1056 sixes.
• In the Indian Premier League (IPL), Gayle holds the record for the most sixes with 357.
Additional Information
• Virat Kohli
• Known as the "Hitman" for his explosive batting style and is one of the most successful IPL captains with multiple titles.
• Known as one of the best batsmen in the world, Kohli has numerous records in all formats of cricket.
• Former captain of the Indian cricket team and the Royal Challengers Bangalore in the IPL
• Known for his consistency, especially in chasing targets, earning him the nickname "Chase Master."
• Rohit Sharma:
• Known as the "Hitman" for his explosive batting style and is one of the most successful IPL captains with multiple titles
• Current captain of the Indian cricket team and the Mumbai Indians in the IPL.
• Holds the record for the highest individual score in ODI cricket (264 runs).
• MS Dhoni:
• Former Indian captain who led India to victory in all major ICC tournaments, including the T20 World Cup (2007), ODI World Cup (2011), and Champions Trophy (2013).
• Renowned for his calm demeanor and exceptional finishing ability.
• Captains the Chennai Super Kings (CSK) in the IPL, leading them to several titles. Known as "Captain Cool."
Important Points
• Rohit Sharma
• The Indian batter became the first Indian to hit 500 sixes in T20 cricket on April 15, 2024.
• He also broke Chris Gayle's record for the most international sixes on October 11, 2023.

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Q39. Answer: (d) 4/7, 2/3, 5/6,7/8

Problem:

Arrange the fractions 4/7, 5/6, 2/3, and 7/8 in ascending order.

Solution:

Convert fractions to decimal form:

4/7 ≈ 0.5714

5/6 ≈ 0.8333

2/3 ≈ 0.6667

7/8 = 0.875

Arrange the decimals in ascending order:

0.5714, 0.6667, 0.8333, 0.875

Match the decimals to their corresponding fractions:

0.5714 → 4/7

0.6667 → 2/3

0.8333 → 5/6

0.875 → 7/8

Final Answer:

The ascending order of the fractions is: 4/7, 2/3, 5/6, 7/8

Q40. Answer: (b) $a^2 + b^2 = 34$

Shortcut Trick

Use the direct standard identity: If $a\cos\theta + b\sin\theta = m$ and $b\cos\theta - a\sin\theta = n$, then $a^2 + b^2 = m^2 + n^2$.

Here, m = 5 and n = 3.

=> $a^2 + b^2 = 5^2 + 3^2$

=> $a^2 + b^2 = 25 + 9 = 34$

Therefore The correct answer is $a^2 + b^2 = 34$.

Alternate Method

Given:

$a\cos\theta + b\sin\theta = 5$ — (Eq. 1)

$b\cos\theta - a\sin\theta = 3$ — (Eq. 2)

Formula Used:

$(x + y)^2 + (x - y)^2 = 2(x^2 + y^2)$ and the trigonometric identity $\sin^2\theta + \cos^2\theta = 1$.

Calculations:

Squaring Equation 1:

=> $(a\cos\theta + b\sin\theta)^2 = 5^2$

=> $a^2\cos^2\theta + b^2\sin^2\theta + 2ab\sin\theta\cos\theta = 25$ — (Eq. 3)

Squaring Equation 2:

=> $(b\cos\theta - a\sin\theta)^2 = 3^2$

=> $b^2\cos^2\theta + a^2\sin^2\theta - 2ab\sin\theta\cos\theta = 9$ — (Eq. 4)

Adding Equation 3 and Equation 4:

=> $(a^2\cos^2\theta + a^2\sin^2\theta) + (b^2\sin^2\theta + b^2\cos^2\theta) + (2ab - 2ab)\sin\theta\cos\theta = 25 + 9$

=> $a^2(\cos^2\theta + \sin^2\theta) + b^2(\sin^2\theta + \cos^2\theta) = 34$

=> $a^2(1) + b^2(1) = 34$

=> $a^2 + b^2 = 34$

Therefore The correct answer is $a^2 + b^2 = 34$.

Additional Information

Trigonometric Identity

The most fundamental identity used here is $\sin^2\theta + \cos^2\theta = 1$, which holds for all real values of θ.

General Algebraic Form

If $a\sin\theta + b\cos\theta = c$, then the value of $a\cos\theta - b\sin\theta$ is equal to $\pm\sqrt{(a^2 + b^2 - c^2)}$.

Squaring and Adding Method

This technique is frequently used to eliminate the trigonometric parameter (θ) and find a relationship between the constants.

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Q41. Answer: (b) 108°

Given:

Area of the shaded sector = 70% of the area of the circle

Formula used:

Area of a sector = (x/360) × πr²

Area of the circle = πr²

Since the shaded area is 70% of the circle:

(x/360) × πr² = (70/100) × πr²

Calculations:

Cancel πr² from both sides:

=> x/360 = 70/100

=> x = (70 × 360) / 100

=> x = 252°

If the shaded area represents the remaining part (30%), you divide accordingly:

Calculate 360° - 252° = 108°.

Thus:

Therefore The measure of x° is 108° shaded

Q42. Answer: (d) 1993

The correct answer is 1993

Key Points

• The Prime Minister Rozgar Yojana (PMRY) was implemented on October 2, 1993:

• The scheme was launched on October 2, 1993, to commemorate the birthday of Mahatma Gandhi.

• Its primary purpose was to provide financial assistance to educated unemployed youth, enabling them to start their own businesses.

• The target group consisted of educated unemployed individuals aged 18 to 35 years, with age relaxations provided for specific groups.

• Initially, the scheme covered only urban areas in 1993–94 but was later extended to include all areas in 1994–95.

• The scheme has undergone several modifications and developments, including:

• Lowering the educational qualification for women from 10th class to 8th class

• Increasing the upper limit of project cost from Rs 1 lakh to Rs 2 lakh

• Providing group financing eligibility up to Rs 5 lakh

• Increasing the upper age threshold to 40 years in the North Eastern States

Q43. Answer: (c) Malik Muhammad Jayasi

The correct answer is Malik Muhammad Jayasi

Key Points

• Malik Muhammad Jayasi was the author of the epic poem Padmaavat.

• He wrote the poem in the Hindustani language of Awadhi in 1540.

• It is one of the most important Awadhi texts still in existence.

Additional Information

• Firdausi:

• A Persian poet best known for writing the "Shahnameh" ("The Book of Kings"), an epic poem that is a cornerstone of Persian literature.

• The "Shahnameh" recounts the history and mythology of ancient Persia.

• Gulbadan Begum:

• A Mughal princess and the daughter of Emperor Babur.

• She authored the "Humayun-nama", a memoir providing unique insights into the lives of Mughal royalty, including her brother Humayun.Abul Fazl:

• A prominent historian, scholar, and courtier in Akbar's court.

• He authored the "Akbarnama", a detailed chronicle of Akbar's reign, and the "Ain-i-Akbari", which describes the administration and culture of the Mughal Empire

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Q44. Answer: (a) 63

Given:

The ratio of men to women = 4 : 3

Number of men = 84

Formula Used:

Number of women = (Number of men / Ratio of men) × Ratio of women

Calculation:

Number of women = (84 / 4) × 3

=> Number of women = 21 × 3

=> Number of women = 63

The number of women at the party is 63.

Q45. Answer: (b) E

Given: There are five students A, B, C, D and E, sitting in a row facing towards the north.

1) C is sitting exactly in the middle of the row.

2) E is sitting to the immediate right and to the immediate left of D and C, respectively.

3) B is not sitting at the extreme end.

So, A is left and one position is empty. So, A will sit here.

So, E is sitting third to the left of A.

Hence, the correct answer is "E".

Q46. Answer: (b) 15

Given:

HCF = 3

LCM = 60

First number = 12

Second number = x

Formula used:

HCF × LCM = Product of the two numbers

Calculations:

=> 3 × 60 = 12 × x

=> 180 = 12 × x

=> x = 180 ÷ 12

=> x = 15

Therefore The value of x is 15.

Q47. Answer: (b) Karnataka

The correct answer is Karnataka

Key Points

• The Namdroling Monastery is located in the state of Karnataka, in the Bylakuppe area of the Mysuru district:

• The monastery is also known as the Golden Temple because of its ornate, gilded decor. It's a major center of the Nyingma school of Tibetan Buddhism and is home to:

• A community of over 5,000 monks and nuns

• A junior high school

• A Buddhist philosophy college

• Intricate murals, statues, and other artwork

• The monastery was established in 1963 by Drubwang Padma Norbu Rinpoche, the 11th throne holder of the Palyul lineage.

• The His Holiness Dalai Lama bestowed the name "Namdroling" on the monastery.

Q48. Answer: (d) Fundamental Rights

The correct answer is Fundamental Rights

Key Points

• The Preamble of the Indian Constitution is known as the "soul of the Constitution":

• The Preamble is the introductory part of the Constitution and encapsulates the fundamental values and goals of the country.

• It also provides a standard to evaluate the actions and laws of the government.

• Significance

• The Preamble reflects the core constitutional values of India, such as liberty, equality, and justice.

• The opening and closing sentences of the Preamble, "We, the people… adopt enact and give to ourselves this Constitution," signify the power vested in the hands of the people.

• Enforceability

• The Preamble is not enforceable in courts, but it has been treated as a guiding light in the interpretation of the Constitution by various Indian courts

Additional Information

• Lok Sabha

• The lower house of India's Parliament, also known as the House of the People.

• The Lok Sabha is made up of representatives of the people who are elected directly.

• The Constitution allows for a maximum of 550 members in the Lok Sabha.

• Rajya Sabha

• The upper house of India's Parliament, also known as the Council of States.

• The Rajya Sabha has 245 seats, with 233 members representing the States and the Union Territories, and 12 members nominated by the President.

• Directive Principles of State Policy (DPSP)

• These principles outline that the State should strive to promote the welfare of the people by ensuring social, economic, and political justice in all institutions of the nation. DPSP is non-justiciable and not enforceable by law.

Q49. Answer: (a) an agricultural scientist

The correct answer is agricultural Scientist

Key Points

• MS Swaminathan was an agricultural scientist, plant geneticist, and conservationist:

• Agricultural scientist

• Swaminathan is known as the "Father of the Green Revolution" for his role in helping India achieve food security in the 1960s and 1970s.

• His work included introducing high-yielding varieties of wheat and rice, developing semi-dwarf wheat varieties, and providing fertilizers and irrigation facilities.

• Conservationist

• Swaminathan worked on conservation in areas such as biodiversity, genetic conservation, and mangrove ecosystems.

• He was also the president of the International Union for Conservation of Nature and Natural Resources from 1984–1990.

• Plant geneticist

• Swaminathan began his career in 1949 researching the genetics of rice, wheat, potatoes, and jute.

• Swaminathan was born on August 7, 1925, and passed away on September 28, 2023, at the age of 98.

• He was awarded the Bharat Ratna, which recognizes contributions to agriculture and farmers' welfare

Q50. Answer: (a) 54 cm

Given:

Diameter of the spherical ball = 12 cm

Radius of the spherical ball = 12/2 = 6 cm

Diameter of the base of the cone = 8 cm

Radius of the base of the cone = 8/2 = 4 cm

Formula Used:

Volume of a sphere = $4/3\pi r^3$

Volume of a cone = $1/3\pi r^2h$

Calculation:

Volume of the spherical ball = $4/3\pi (6)^3$

Volume of the spherical ball = $4/3\pi (216)$

Volume of the spherical ball = 288π cm^3

Let the height of the cone be h cm.

Volume of the cone = 1/3π $(4)^2$h

Volume of the cone = 1/3π (16)h

Volume of the cone = 16/3π h cm^3

Since the spherical ball is melted and cast into the cone, their volumes are equal.

=> 288π = 16/3π h

=> 288 = 16/3h

=> 288 × 3 = 16h

=> 864 = 16h

=> h = 864 / 16

=> h = 54 cm

The height of the cone is 54 cm.

Q51. Answer: (c) 42, 14 years

Given:

The sum of the ages of father and son = 56 years.

7 years ago, the father's age was 5 times the age of the son.

Formula Used:

Let the present age of the father be F years.

Let the present age of the son be S years.

F + S = 56

7 years ago, the father's age was F - 7 years.

7 years ago, the son's age was S - 7 years.

According to the given condition:

F - 7 = 5 × (S - 7)

Calculation:

From the first equation:

F + S = 56

From the second equation:

F - 7 = 5 × (S - 7)

=> F - 7 = 5S - 35

=> F = 5S - 28

Substitute F in the first equation:

5S - 28 + S = 56

6S - 28 = 56

=> 6S = 84

=> S = 14

Substitute S in the first equation:

F + 14 = 56

=> F = 42

The present ages of the father and son are 42 years and 14 years respectively.

Q52. Answer: (d) Tamil

The correct answer is Tamil

Key Points

• The Tamil film "Koozhangal" (translated as "Pebbles"), directed by P.S. Vinothraj, won the prestigious Tiger Award at the 50th International Film Festival Rotterdam (IFFR) 2021.

• This award is the top honor at the IFFR, recognizing innovative and daring cinematic talent.

• "Koozhangal" is a poignant story that explores the strained relationship between a father and his son, set in a rural Tamil Nadu backdrop.

• The film's minimalistic storytelling and raw portrayal of emotions were highly praised by critics and audiences alike.

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Q53. Answer: (a) 44/13

Given:

Expression: 2 + 1 / (1 + 2 / (1 1/4)) + 1

Formula used:

To solve this, we first simplify the fractional part:

1 1/4 = 5/4

Now, the expression becomes: 2 + 1 / (1 + 2 / (5/4)) + 1

Calculations:

1 + 2 / (5/4) = 1 + (2 × 4 / 5) = 1 + 8/5 = (5 + 8) / 5 = 13/5

Now, the expression becomes: 2 + 1 / (13/5) + 1

1 / (13/5) = 5/13

Thus, the expression is: 2 + 5/13 + 1

Combine terms: 2 + 1 = 3

So, the expression becomes: 3 + 5/13 = (39/13) + (5/13) = 44/13

Therefore The value of the expression is 44/13, which corresponds to option 1.

Q54. Answer: (d) [figure]

Given: Dollar, Rupee, Currency

Dollar and Rupee are distinct subsets of Currency since they are different types of currencies.

Hence, the correct answer is "Option 4".

Q55. Answer: (a) 5 √(2) cm

Given:

The sides of the rectangular box are 3 cm, 4 cm, and 5 cm.

Formula used:

The maximum length of a stick that can be placed inside the box is the diagonal of the rectangular box, which can be found using the 3D Pythagoras theorem:

Diagonal (d) = $\sqrt{(a^2 + b^2 + c^2)}$

Where, a = 3 cm, b = 4 cm, c = 5 cm

Calculations:

d = $\sqrt{(3^2 + 4^2 + 5^2)}$

=> d = $\sqrt{(9 + 16 + 25)}$

=> d = $\sqrt{50}$

=> d = $5\sqrt{2}$ cm

Therefore The maximum length of the stick that can be placed inside the box is $5\sqrt{2}$ cm, which corresponds to option 1.

Q56. Answer: (b) Uttarakhand

The correct answer is Uttarakhand

Key Points

• Rajaji National Park is located in the state of Uttarakhand, India.

• It was established in 1983 by combining three wildlife sanctuaries: Rajaji, Motichur, and Chilla.

• The park is part of the Shivalik Hills and the Himalayan foothills.

• It is well-known for its Asian elephants, tigers, leopards, and a rich variety of flora and fauna.

• Rajaji National Park is also an important part of the Rajaji Tiger Reserve, designated under Project Tiger in 2015.

Q57. Answer: (b) UOCCARETSTNEM

The logic followed here is:

'ORTHOPEDICIAN' is written as 'OHTRODEPNAICT'.

Similarly, 'ACCOUTERMENTS' be written as:

Hence, the correct answer is "UOCCARETSTNEM".

Q58. Answer: (a) 48 m

Given:

Height of the building = 72 meters

Angle of depression to the top of the temple = 30º

Angle of depression to the bottom of the temple = 60º

Formula Used:

tan (θ) = Opposite/Adjacent

Calculation:

Let the height of the temple be h meters and the distance from the building to the temple be d meters.

For the top of the temple:

tan (30°) = (72 - h)/d

tan (30°) = 1/√3

=> 1/√3 = (72 - h)/d

=> d = √3 (72 - h)

For the bottom of the temple:

tan (60°) = 72/d

tan (60°) = √3

=> √3 = 72/d

=> d = 72/√3

=> d = 24 √3

Equating both expressions for d:

√3 (72 - h) = 24√3

=> 72 - h = 24

=> h = 72 - 24

=> h = 48 meters

The height of the temple is 48 meters.

Q59. Answer: (a) Mangrove forests

The correct answer is Mangrove Forests

Key Points

• Mangrove forests are unique coastal ecosystems found in tropical and subtropical regions.

• These forests grow in areas where freshwater and seawater mix, such as estuaries, deltas, and coastal lagoons.

• The trees in these forests have specialized roots, such as prop roots and pneumatophores, which allow them to survive in waterlogged, oxygen-deficient soils.

• These roots are often submerged in water, particularly during high tide.

• Mangroves are critical for protecting coastlines from erosion and storm surges and serve as nurseries for many marine species.

Additional Information

• Pine forests are found in colder, mountainous regions and do not grow in waterlogged areas.

• Tropical deciduous forests shed their leaves in the dry season and grow in regions with distinct wet and dry periods.

• Thorn forests and scrubs are found in arid and semi-arid regions and are adapted to dry conditions, not waterlogging.

Q60. Answer: (b) [figure]

Given: Strolling, Walking, Movement

Strolling is a subset of walking as it refers to a relaxed form of walking, while walking itself is a subset of movement, which encompasses all physical actions involving a change in position.

The best possible Venn diagram:

Hence, the correct answer is "Option 2".

Q61. Answer: (a) 500

Given:

Marks obtained by the student = 130 marks

Marks by which student failed = 35 marks

Passing percentage = 33%

Formula Used:

Passing Marks = 33% of Maximum Marks

Calculation:

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Marks required to pass = 130 + 35
Marks required to pass = 165
Let the maximum marks be x.
33% of x = 165
=> (33/100) × x = 165
=> x = (165 × 100) / 33
=> x = 500
The maximum marks for the exam is 500.

Q62. Answer: (d) 10

Given:
Distance from A to B = 300 km
Time taken from A to B = 3 hours 20 minutes = 3 + 20/60 = 3.333 hours
Distance from B to A = 300 km
Time taken from B to A = 4 hours 10 minutes = 4 + 10/60 = 4.167 hours
Formula Used:
Average speed = Total distance travelled / Total Time
Calculation:
Average speed from A to B
=> Speed_(AB) = Distance / Time = 300 / 3.333
=> Speed_(AB) = 90 km/hr
Average speed for the entire trip
Total Distance = 300 + 300 = 600 km
Total Time = 3.333 + 4.167 = 7.5 hours
=> Average Speed_(Total) = Total Distance / Total Time
=> Average Speed_(Total) = 600 / 7.5
=> Average Speed_(Total) = 80 km/hr
Difference in average speed
=> Difference = Speed_(AB) - Average Speed_(Total)
=> Difference = 90 - 80
=> Difference = 10 km/hr
The average speed from A to B exceeds the average speed for the entire trip by 10 km/hr.

Q63. Answer: (d) Kakrapar

The correct answer is Kakrapar
Key Points
• The Kakrapar Atomic Power Station (KAPS) is a nuclear power reactor located in Gujarat, India
• Reactor types: Pressurized Heavy Water Reactors (PHWR)
• Capacities: Units 1 and 2 have a capacity of 220 MWe, while units 3 and 4 have a capacity of 700 MWe
• KAPP-3 and KAPP-4: These two 700 MWe indigenous nuclear reactors were dedicated to the nation by the Prime Minister
• KAPS-4: This unit achieved first criticality in December 2023 and started commercial operations in March 2024
Additional Information
• Narora Atomic Power Station (NAPS)
• Located in Uttar Pradesh, this nuclear power plant began commercial operations in January 1991.
• Tarapur
• The first nuclear power station in India, with a capacity of 320 MW, was built near Mumbai in 1969.
• Rana Pratap Sagar Dam
• Built on the Chambal River in Rajasthan, this dam is part of the Chambal Valley Project. It was opened in 1970 and is 177 ft tall.

Q64. Answer: (b) Indian Standard Code for Information Interchange

The correct answer is the Indian Standard Code for Information Interchange
Key Points
• The full form of ISCII is the Indian Standard Code for Information Interchange.

• It is a coding scheme that represents the writing systems of India, including the main Indic scripts and a Roman transliteration.
• The Bureau of Indian Standards (BIS) released ISCII in 1997.
• ISCII uses 8 bits to represent characters.
• The first 128 characters of ISCII are the same as the ASCII coding.
• The remaining characters, from 128–255, are characters from different Indian languages.
• ISCII allows English and Indian script alphabets to be used simultaneously.
• ISCII is a super-set of all the characters needed in the ten Brahmi-based Indian scripts.
• ISCII's single encoding schema makes it easier to transliterate between different writing systems.

Q65. Answer: (c) Lok Sabha

The correct answer is Lok Sabha

Key Points

• The Council of Ministers is collectively responsible to the Lok Sabha, or House of the People.
• This is stated in Article 75(3) of the Indian Constitution.
• The Council of Ministers acts as a bridge between the Executive and the Legislature.
• This means that the Council of Ministers is responsible for every action of the Government as a single unit before the Lok Sabha.
• If the Lok Sabha loses faith in the Council of Ministers, it can pass a No-Confidence Motion, which forces the entire Council to resign.

Q66. Answer: (a) Stare

The logic followed here is:

Stare	Action
Jump	Movement
Run	Movement
Dance	Movement

Jump, Run, and Dance all are actions related to movement,

Whereas,

Stare is an action related to looking and not movement.

Hence, the correct answer is "Stare".

Q67. Answer: (c) Mango showers

The correct answer is Mango Showers

Key Points

• The pre-monsoon showers that occur in Kerala and Karnataka towards the end of summer are known as mango showers.
• These showers are also called April rains or summer showers.
• Mango showers are caused by thunderstorms that develop in the Bay of Bengal.
• They can range from light showers to heavy rains with thunder.
• These showers help mangoes ripen early, which is why they are called mango showers.

Additional Information

• Kal Baisakhi
• A calamity in the month of Baisakh, Kal Baisakhi is a localized downpour with severe winds and torrential precipitation that can cause damage to trees and property.
• It occurs in the states of Assam, Bihar, Chhattisgarh, Jharkhand, Odisha, and West Bengal, and can happen from March until the monsoon settles.
• Jet streams
• Jet streams occur in both the Northern and Southern Hemispheres, and are the result of the interaction of many variables, such as warm and cold air, high and low pressure systems, and seasonal changes.
• The Earth has four primary jet streams: two polar jet streams near the poles, and two subtropical jet streams closer to the equator.

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Q68. Answer: (d) Manasa Varanasi

The correct answer is Manika Sheokand

Key Points

• Manasa Varanasi from Telangana was crowned the winner of the 2020 VLCC Femina Miss India World pageant

• The 2020 pageant was held on February 10–11 at the Hyatt Regency Hotel in Mumbai.

• The winners were announced on February 11, and the pageant was hosted by Suman Ratan Singh Rao, the 2019 winner.

Additional Information

• Suman Ratan Singh Rao was the Femina Miss India World 2019 winner.

• Manya Singh won the title of Femina Miss India 2020 – Runner-up, celebrated for her inspiring journey as the daughter of an auto-rickshaw driver.

• Manika Sheokand won the title of VLCC Femina Miss Grand India 2020.

Q69. Answer: (c) 4

The logic followed here is: (Sum of middle numbers) = (Sum of bottom numbers) × Top number

Figure 1: (12 + 30) = (3 + 4) × 6 => 42 = 42

Figure 2: (16 + 19) = (2 + 3) × 7 => 35 = 35

Figure 3: (18 + 14) = (5 + 3) × ?

=> 32 = 8 × ?

=> ? = 32 / 8 = 4

Hence, the correct answer is "4".

Q70. Answer: (c) √(π) : 2

Given:

Area of circle = Area of square

Formula used:

Area of circle = πr^2

Area of square = $side^2$

Calculations:

$\pi r^2 = side^2$

=> $r = \sqrt{(side^2/\pi)}$

The circumference of the circle = $2\pi r$

The perimeter of the square = 4 × side

Now, substituting $r = \sqrt{(side^2/\pi)}$ in the circumference formula:

Circumference of the circle = $2\pi\sqrt{(side^2/\pi)}$

=> Circumference of the circle = 2 × side × √π

Now, the ratio of the circumference of the circle to the perimeter of the square is:

Ratio = (2 × side × √π) / (4 × side)

=> Ratio = (2 × √π) / 4

=> Ratio = √π / 2

=> Ratio = √π : 2

Therefore The ratio of the circumference of the circle to the perimeter of the square is √π : 2

Q71. Answer: (c) KP

The logic followed here is: Letters are opposite to each other.

Hence, the correct answer is "KP".

Q72. Answer: (b) Kaziranga National Park

The correct answer is Kaziranga National Park

Key Points

• Kaziranga National Park in Assam is a UNESCO World Heritage Site:

• Known for: Kaziranga is famous for its conservation efforts, especially for the protection of the Indian one-horned rhinoceros.

• It is home to about two-thirds of the world's one-horned rhinoceros population.

• When it became a World Heritage Site: Kaziranga was declared a UNESCO Natural World Heritage Site in 1985.

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• Other highlights: Visitors can enjoy elephant safaris, jeep safaris, and seeing water buffalo.

Additional Information

• Jim Corbett National Park:

• Location: Uttarakhand

• Significance: Established in 1936 as India's first national park, it was initially called Hailey National Park.

• It is named after the British hunter and conservationist Jim Corbett.

• Famous For: Bengal tigers, especially as part of the Project Tiger initiative, and diverse flora and fauna.

• Dudhwa National Park:

• Location: Uttar Pradesh

• Significance: It is part of the Terai Arc Landscape, an area critical for tiger conservation.

• Famous For: Tigers, leopards, swamp deer (Barasingha), and a rich variety of birdlife.

• Periyar National Park:

• Location: Kerala

• Significance: Known for its picturesque location around the Periyar Lake, it is a popular ecotourism destination.

• Famous For: Elephants, tigers, and the scenic beauty of the Western Ghats.

Q73. Answer: (a) k + 1over2

Find the median of the observations:

k - 3/2, k + 2, k - 1, k + 4, k + 1/2, k - 3, k + 41/2.

Solution:

Step 1: Arrange the observations in ascending order

The observations are:

k - 3/2, k + 2, k - 1, k + 4, k + 1/2, k - 3, k + 41/2.

Sorting them:

k - 3, k - 3/2, k - 1, k + 1/2, k + 2, k + 4, k + 41/2.

Step 2: Identify the median

Median is the middle value of the ordered data.

For 7 observations, the median is the 4th value.

From the ordered list:

Median = k + 1/2.

Final Answer:

The median of the given observations is k + 1/2.

Q74. Answer: (b) Mandapa

The correct answer is Mandapa

Key Points

• The Mandapa is the part of a Hindu temple that provides space for a large number of worshippers:

• Mandapa:

• The entrance to a Hindu temple, the Mandapa is a pillared hall or pavilion that can be a portico or colonnaded hall.

• It's a communal space where devotees gather and participate in religious ceremonies.

Additional Information

• Other parts of a Hindu temple include:

• Garbhagriha: The innermost sanctuary of a Hindu temple, also known as the "holy of holies".

• It's a cave-like structure that houses the main deity of the temple.

• Shikhara: A mountain-like spire found in North Indian temples.

• Vimana: A pyramidal-like structure found in South Indian temples.

• Amalaka: A stone disc-like structure at the top of the temple, common in North Indian temples.

• Kalasha: The topmost point of the temple, common in North Indian temples.

• Antarala: A transition area between the Garbhagriha and the temple's main hall (mandapa).

• Jagati: A raised platform for sitting and praying, common in North Indian temples.

• Vaahan: The mount or vehicle of the main deity of the temple

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Q75. Answer: (c) 42

Given:

9/13 of a number is 54

Formula used:

9/13 × x = 54

Calculations:

=> x = (54 × 13)/9

=> x = 702/9 = 78

Now, to find 7/13 of the same number:

=> 7/13 × 78 = (7 × 78)/13 = 546/13 = 42

Therefore The value of 7/13 of the number is 42.

Q76. Answer: (a) 52

Given:

1. A heartsuit B = $A^2 \times B \div 2$

2. A diamondsuit B = A + B^2

Then,

=> (4 heartsuit 6) diamondsuit 2 = ?

= ($4^2 \times 6 \div 2$) diamondsuit 2

= (16 × 3) diamondsuit 2

= 48 diamondsuit 2

= 48 + 2^2

= 48 + 4

= 52

Hence, the correct answer is "52".

Q77. Answer: (b) 5 : 1

Given:

Ratio of A to B = x : 12

Ratio of B to C = 4 : y

Ratio of A to C = 5 : 3

Formula used:

From the given ratios, we know that:

A : B = x : 12 → A = (x/12) × B

B : C = 4 : y → B = (4/y) × C

A : C = 5 : 3 → A = (5/3) × C

Calculations:

=> A = (x/12) × B and B = (4/y) × C

=> A = (x/12) × (4/y) × C

=> A = (4x/12y) × C

But we also know A = (5/3) × C, so:

=> (4x/12y) × C = (5/3) × C

=> 4x/12y = 5/3

=> 4x × 3 = 12y × 5

=> 12x = 60y

=> x/y = 60/12

=> x/y = 5

=> x : y = 5 : 1

Therefore The ratio of x to y is 5 : 1.

Q78. Answer: (a) Input Device

The correct answer is Input Device

Key Points

• A trackball is an input device and a pointing device:
• Input device
• A trackball is a device that enters motion data into a computer or other electronic device.
• Pointing device
• A trackball is a pointing device that allows a user to input spatial data to a computer.
• Trackball vs Normal Mouse: Explained - Switch and Click
• A trackball is similar to an upside-down mouse, with a ball in a socket that contains sensors.
• The user moves the ball with their fingers, thumb, or palm to move the cursor on the screen.
• Trackballs are often used in applications where space is limited, such as arcade games or certain specialized tasks.
• Some mobile devices, such as the BlackBerry, T-Mobile Sidekick 3, and early HTC smartphones, also have trackballs.
• Some disadvantages of trackballs include:
• It can take some time to get used to using a trackball.
• The ball can become dirty or sticky over time, which can affect its performance.
• Some trackballs have limited compatibility with certain types of software and gaming applications.

Additional Information
• Storage devices
• Store data, even when the computer is off:
• Hard disk drive (HDD): Uses magnetic storage to store and retrieve data
• Solid-state drive (SSD): A type of mass storage technology similar to HDDs
• Random access memory (RAM): Temporary storage for data that is currently being used by the computer
• Read-only memory (ROM): Stores data that cannot be changed, such as the BIOS
• Processing devices
• Process instructions and perform calculations:
• Central Processing Unit (CPU): Also known as the processor, it provides the instructions and processing power the computer needs to do its work
• Motherboard: The main circuit system of the computer that connects all other devices

Q79. Answer: (b) 1992

The correct answer is 1992

Key Points
• The Liberalized Exchange Rate Management System (LERMS) was introduced in India in March 1992.
• It was a dual exchange rate system that was a transitional step towards a market-determined exchange rate system.
• LERMS was a response to the 1991 balance of payments crisis, which made economic reforms a necessity.
• The system involved the following:
• 40% of exchange earnings were surrendered at an official rate set by the Reserve Bank
• The Reserve Bank only sold foreign exchange for essential commodities
• LERMS was eventually replaced by the UERS, which allowed the rupee to be fully determined by the market.
• This was a significant step towards an open exchange market.

Q80. Answer: (c) FGD

The logic followed here is:
'HJP' is related to 'KMS'
Similarly, 'CDA' is related to '_____'.
Hence, the correct answer is "FGD".

Q81. Answer: (d) 5

Given:
For how many positive integers 'a' it is true that $a^2 \leq 5a$.
Formula Used:
To solve the inequality $a^2 \leq 5a$.
Calculation:
Rewrite the inequality:
$a^2 \leq 5a$

=> $a^2 - 5a \leq 0$

Factorize the quadratic expression:

=> $a(a - 5) \leq 0$

The critical points are a = 0 and a = 5.

Test intervals around the critical points:

For $0 < a \leq 5$:

Pick a = 1:

=> $1(1 - 5) = 1 \times -4 = -4$ (which is ≤ 0)

For $a > 5$:

Pick a = 6:

=> $6(6 - 5) = 6 \times 1 = 6$ (which is not ≤ 0)

Thus, the valid range for 'a' is 1 to 5.

Count the positive integers in this range:

1, 2, 3, 4, 5

Total count = 5

The number of positive integers 'a' for which $a^2 \leq 5a$ is 5.

Q82. Answer: (a) Carolina Marin

The correct answer is Carolina Marin

Key Points

• In the 2016 Rio Summer Olympics, the women's badminton singles final was held on August 19, 2016.

• The match featured Carolina Marín of Spain and P.V. Sindhu of India.

• Carolina Marín won the gold medal by defeating P.V. Sindhu in a thrilling final.

• The match ended with scores of 19–21, 21–12, 21–15, in favor of Marín.

• This victory marked Marín's first Olympic gold medal and made her the first non-Asian woman to win an Olympic gold in badminton singles.

• P.V. Sindhu, despite the loss, became the first Indian woman to win an Olympic silver medal in badminton, a historic achievement for India.

• Marín's aggressive playing style, combined with her tactical intelligence and strong defense, was key to her victory in the final.

• She had previously won multiple prestigious tournaments, but this Olympic gold solidified her as one of the best players in women's badminton history.

Additional Information

• Nozomi Okuhara: A Japanese badminton player, Okuhara is a former World Champion (2015) and a bronze medalist in the 2016 Rio Olympics. She is known for her speed and exceptional defensive skills. Okuhara is considered one of the best in women's singles.

• P.V. Sindhu: An Indian badminton player, Sindhu is a two-time Olympic medalist (silver in 2016, bronze in 2020). She has also won several prestigious titles, including the World Championships (2019). Sindhu is celebrated for her powerful smashes and strong presence on the court.

• Saina Nehwal: Another prominent Indian badminton player, Nehwal is a former World No. 1 in women's singles and has won numerous titles, including the 2010 Commonwealth Games gold medal. She is known for her consistency, agility, and offensive game.

Q83. Answer: (d) 22H9

The logic followed here is:

Hence, the correct answer is "22H9".

Q84. Answer: (d) Venus

The correct answer is Venus

Key Points

• Venus is the brightest planet in the night sky:

• Venus is the brightest planet in our solar system and is often the brightest object in the sky, aside from the moon. It's visible within a few hours of sunset or before sunrise.

• Venus looks like a very bright star. It's also known as the "Morning Star" and the "Evening Star".

• Cause of brightness

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• Venus's thick clouds reflect most of the sunlight that reaches it. Its atmosphere is rich in carbon dioxide, which makes it highly reflective.
• Other facts
• Venus is the closest planet to Earth.
• It's a terrestrial planet, which means it has a rocky body.
• It doesn't have any moons.
• It rotates in the opposite direction of all planets except Uranus.
Additional Information
• Mercury
• The smallest planet in our solar system.
• It and Venus are the only planets without moons.
• Jupiter
• The most massive planet, more massive than all the other planets combined. Jupiter is part of the Jovian planets, which are also known as "gas giants" because they are mostly made of gas.
• Saturn
• Has the most natural satellites, or moons, of any planet.
• Formation
• The rocky planets, like Mercury and Venus, formed close to the sun because of higher boiling points.
• The giant planets, like Jupiter and Saturn, formed farther out because of more plentiful ices.

Q85. Answer: (d) 64°

Given :
BO and CO are angular bisectors of angle DBC and angle BCE respectively
Concept use : angle BOC = 90° - angle A/2
Calculation :
angle BOC = 90° - angle A/2
x = 90° - 52°/2
x = 90° - 26° = 64°
x = 64°

Q86. Answer: (b) 16.66%

Let's calculate the total number of students who appeared for interviews in 2012 from all departments:
Total students in 2012 = 410 + 300 + 250 + 280 + 440 = 1680
Now, the number of students from Department D in 2012 is 280.
So, the percentage of students from department D in 2012 = (280/1680) × 100% = 16.67%
Therefore, the answer is approximately 16.66%. So, the correct option is 2).

Q87. Answer: (d) 2016

To calculate the percentage increase or decrease in production for branch Y from the previous year, we use the formula:
Percentage Change = [(New Value - Old Value) ÷ Old Value] × 100
Step-by-Step Calculation:
2013 compared to 2012:
Old Value = 30
New Value = 35
Percentage Change = [(35 - 30) ÷ 30] × 100 = (5 ÷ 30) × 100 = 16.67% (Increase)
2014 compared to 2013:
Old Value = 35
New Value = 42
Percentage Change = [(42 - 35) ÷ 35] × 100 = (7 ÷ 35) × 100 = 20% (Increase)
2015 compared to 2014:
Old Value = 42
New Value = 40
Percentage Change = [(40 - 42) ÷ 42] × 100 = (-2 ÷ 42) × 100 = -4.76% (Decrease)

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2016 compared to 2015:
Old Value = 40
New Value = 50
Percentage Change = [(50 - 40) ÷ 40] × 100 = (10 ÷ 40) × 100 = 25% (Increase)
Observation:
The highest percentage change is 25% increase in 2016 (2015 → 2016).
To determine the year with the highest percentage increase or decrease in production for branch Y:
Percentage Change Summary for Branch Y:
2013 compared to 2012 (2012 → 2013): 16.67% increase
2014 compared to 2013 (2013 → 2014): 20% increase
2015 compared to 2014 (2014 → 2015): 4.76% decrease
2016 compared to 2015 (2015 → 2016): 25% increase
Observation:
The highest percentage change is 25% increase in 2016 (2015 → 2016).
Correct Answer:
4) 2016

Q88. Answer: (b) 1 : 4

Total sales of company A: 250 + 150 + 275 + 255 + 310 = 1240 thousand smartphones
Sales of company A in 2018: 310 thousand smartphones
Ratio: 310/1240 = 31/124
Simplifying the ratio: Dividing both numerator and denominator by 31, we get: 31/124 = 1/4
Therefore, the ratio of the number of smartphones sold by company A in 2018 to their total sales during the given period is 1:4.

Q89. Answer: (c) Rs. 461

The marked price of the smartboard is 30% above the cost price.
The marked price is Rs. 2000.
Step 1: Find the cost price:
If the marked price is 30% above the cost price, then the cost price is 100% of the cost price.
So, the marked price is 130% of the cost price.
We can set up the equation:
130% of cost price = Rs. 2000
Or, 1.3 × cost price = Rs. 2000
Therefore, the cost price = Rs. 2000 / 1.3 ≈ Rs. 1538.46
Step 2: Find the manufacturing cost:
From the pie chart, we can see that the manufacturing cost is 30% of the total cost price.
So, the manufacturing cost = 30% of Rs. 1538.46
= 0.3 × Rs. 1538.46 ≈ Rs. 461.54
Therefore, the approximate manufacturing cost is Rs. 461.54.

Q90. Answer: (b) 2

The logic followed here is:
For 6, 4,11
=> 6 × 4 - 11 × 2 = 24 - 22 = 2
For 4, 3, 5
=> 4 × 3 - 5 × 2 = 12 - 10 = 2
For 3, 6, 8
=> 3 × 6 - 8 × 2 = 18 - 16 = 2
Similarly, For 6, 1, ?
=> 6 × 1 - ? × 2 = 2
=> 2 × ? = 6 - 2
=> ? = 4 / 2 = 2
Hence, the correct answer is "2".

Q91. Answer: (d) 3

The logic followed here is:

Figure 1: (13 + 12) = (4^2 + 3^2) => 25 = 16 + 9 = 25

Figure 2: (11 + 18) = (52 + 22) => 29 = 25 + 4 = 29

Figure 3: (23 + 22) = (62 + ?2)

=> 45 = 36 + ?2

=> ?2 = 45 - 36 = 9

=> ? = 3

Hence, the correct answer is "3".

Q92. Answer: (c) Father

Family Chart:

Given: Guava is the only uncle of Grape. Mango is the mother of Apple. Kiwi is Apple's paternal uncle. Banana and Grape are the children of Kiwi. Banana's mothe, Orange, is the only child of her parents.

So, Guava is 'Father' of Apple.

Hence, the correct answer is "Father".

Q93. Answer: (d) 238

The logic followed here is:

Hence, the correct answer is "238".

Q94. Answer: (a) JEAN

The logic followed here is:

'HGLIN' is decoded as 'STORM'

Similarly, 'QVZM' will be decoded as:

Hence, the correct answer is "JEAN".

Q95. Answer: (b) Temple

The logic followed here is:

A doctor works in a hospital.

Similarly,

A priest is primarily associated with a temple.

Hence, the correct answer is "Temple".

Q96. Answer: (b) [figure]

Given: Music, Dance, Sound.

Music is a subset of Sound because music is a type of sound.

Dance is generally independent from sound and music.

Hence, the correct answer is "Option 2".

Q97. Answer: (c) $90

Given:

Price increase rate of Bitcoin = 1 dollar every 20 seconds

Time duration = 30 minutes

Formula Used:

Number of 20-second intervals = Total time in seconds / 20

Calculation:

Time in seconds for half an hour:

30 minutes × 60 seconds per minute = 1800 seconds

Number of 20-second intervals in 1800 seconds:

=> 1800 seconds / 20 seconds per interval = 90

So, the price of Bitcoin increases by:

=> 90 dollars

Hence, the correct answer is "$90".

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Q98. Answer: (a) T

The logic followed here is:

Hence, the correct answer is "T".

Q99. Answer: (c) Only conclusion B follows.

Statements:

1. All earrings are blades.

2. Some guitars are blades.

The least possible Venn diagram:

Conclusions:

A. Some earrings are guitars. - False (Because there is no direct relation between earrings and guitars so it can be possible but not definite)

B. Some blades are earrings. - True (Because All earrings are blades. So, Some blades are earrings. It is definite)

So, Only conclusion B follows.

Hence, the correct answer is "Only conclusion B follows."

Q100. Answer: (a) Both course of action A and course of action B follow.

Given:

Statement: The import of goods by country XYZ is much more than the export of goods.

Course of Action:

A. The government should explore the resources of the country and use them for export - True (as it can help in increasing the export of the country and reduce the imbalance of import-export).

B. The government should reduce the import of the country by initiating schemes and actions to produce the imported goods domestically - True (as it will reduce the dependence on imports and also create employment opportunities in the country).

Therefore, both A and B follow.

Hence, the correct answer is "Option 1".

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