RRC Group D Previous Year Paper 37 (Held On: 9 Oct 2018 Shift 3)

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

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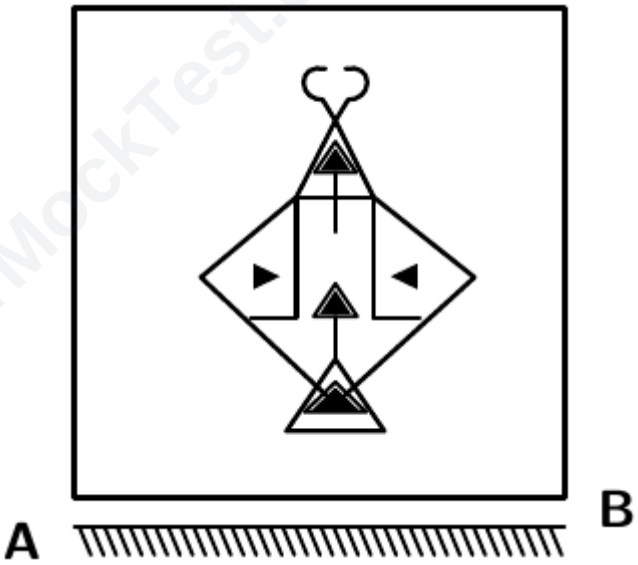
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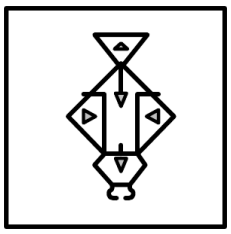
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Q1.

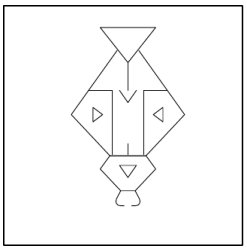


The mirror image of the above figure with respect to the line AB is:

(a)

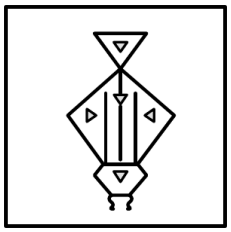


(b)

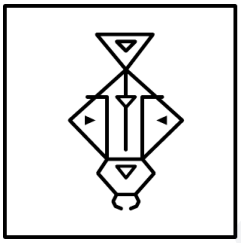


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(c)



(d)



Q2. If Q means +, J means ×, T means -, K means ÷ then what is the value of 40K5Q6J2T13?

(a) 10
(b) 17
(c) 7
(d) 12

Q3. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(s) the statement(s)

Statements:

I. All Mountains are metals.

II. All metals are elements.

Conclusions:

1. All elements are mountains.

2. All element are metals.

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

Q4. Read the given statement(s) and conclusions carefully and select with of the conclusions logically follow(s) from the statement(s).

Statement:

A tailor says to his customer, “We regret the delay, your suit would be ready by this weekend. You don’t have to come to pick up. We will do a door delivery. Please leave your address with us.”

Conclusions:

I. The tailor offers delivery service

II. The tailor had delayed the customer’s work and so offers to deliver at home

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

Q5. In a molecule of water, hydrogen and oxygen are present in the ratio H : O = _____

(a) 3 : 1
(b) 2 : 1
(c) 1 : 3

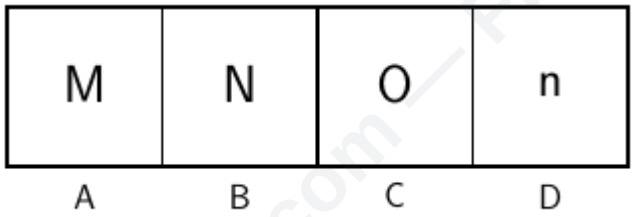
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(d) 1 : 2

Q6. In a triangle ABC, the side BC is extended up to D. Such that CD = AC. If angle BAD = 109° and angle ACB = 72° then the value of angle ABC is

(a) 35°
(b) 60°
(c) 40°
(d) 45°

Q7. Find the odd one out:

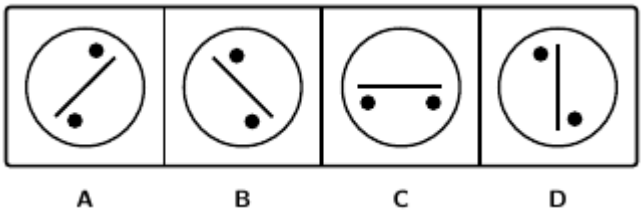


(a) B
(b) D
(c) C
(d) A

Q8. Who launched the Financial Literacy Week in June 2018 across the country with customer protection as the main theme?

(a) Axis Bank
(b) SBI
(c) Reserve Bank of India (RBI)
(d) ICICI

Q9. Find the odd one out.



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

Q10. Who is the first Woman Indian Grandmaster in Chess?

(a) S Vijayalakshmi
(b) Padmini Rout
(c) Humpy Koneru
(d) Kruttika Nadig

Q11. A and B can complete a task in 18 days. However, A had to leave a few days before the task was completed and hence it took 27 days in all to complete the task. If A alone could complete the work in 21 days, how many days before the work getting over did A leave?

(a) 12.5
(b) 14
(c) 10.5
(d) 9

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Q12. The kinetic energy of an object increase with its:

(a) Height
(b) Velocity
(c) Displacement
(d) Distance

Q13. Which of the following sports is Jasvir Singh related to?

(a) Cricket
(b) Kabaddi
(c) Shooting
(d) Hockey

Q14. Leela has a terrace garden for which she buys supplies from a gardener on a monthly basis. Her expense pattern is as follow.

Item	% Expense
New species of plants	20
Compost	40
Mud	10
Cowdung	20
Other supplies	10

If she spends Rs. 750 on Compost, what will be her expected expense on new plants?

(a) Rs. 350
(b) Rs. 250
(c) Rs. 355
(d) Rs. 375

Q15. Which of the following languages - also known as 'Magadhi' - is a language spoken in the Bihar, Jharkhand region of eastern India?

(a) Magahi
(b) Bhojpuri
(c) Meitei
(d) Maithili

Q16. Given below is a statement followed by two assumptions numbered I and II. You have to consider the statement and the following assumptions and decide which of the assumptions is implicit in the statement.

Statement:

Because of heavy traffic, I reached airport late and missed my flight.

Assumptions:

I. Reaching on time is important to catch the flight.

II. Traffic is always heavy in the airport route.

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

Q17. Who has been appointed as the Ambassador of India to Plurinational State of Bolivia?

(a) M. Subbarayudu
(b) Mukta Dutta
(c) Sunil Kumar Lal
(d) CP Ahmad Javed

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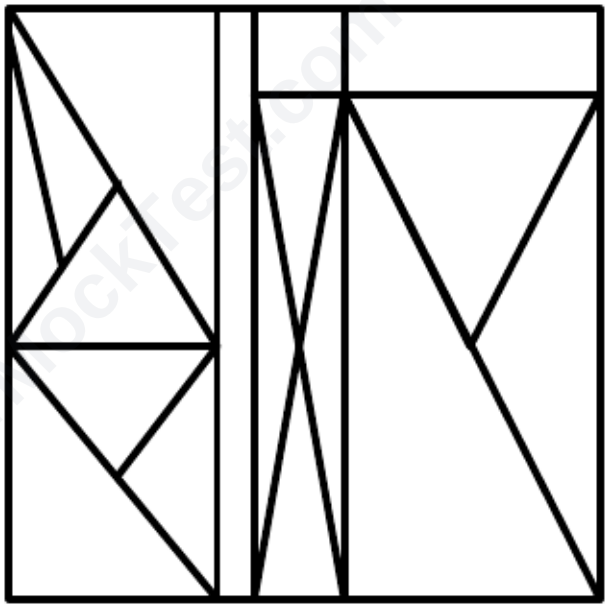
Q18. Mehbooba Mufti, the ex-Chief Minister of Jammu and Kashmir, belongs to which Indian political party?

(a) Indian National Congress
(b) Bharatiya Janata Party
(c) Jammu and Kashmir Peoples Democratic Party
(d) Communist Party of India (Marxist)

Q19. The language used in the Upanishads is _____.

(a) Pali
(b) Brahmi
(c) Sanskrit
(d) Prakrit

Q20. How many triangles are there in the following figure?



(a) 24
(b) 23
(c) 21
(d) 22

Q21. _____ is a saturated hydrocarbon

(a) Acetylene
(b) Propene
(c) Ethene
(d) Ethane

Q22. Who is popularly known as India's first female blade runner?

(a) Shalini Saraswathi
(b) Kiran Kanojia
(c) Sirichandana
(d) Dipti Basker

Q23. An object of mass 15 kg is moving with a uniform velocity of 2 ms^(-1)_.What is the kinetic energy possessed by the object?

(a) 187.5 J
(b) 30 J
(c) 17.5 J
(d) 187.5 ms

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

Optimist: Pessimist ? Success:

(a) Failure
(b) Motivation
(c) Hard work
(d) Leading

Q25. One pipe can fill a tank 6 times as fast as another pipe. If together, the two pipes can fill the tank in 22 minutes, then the fast pipe alone will be able to fill tank in:

(a) 28 min
(b) 30 min
(c) 25.66 min
(d) 27 min

Q26. 4.8 / 125, written as pure decimal, will be:

(a) 0.0374
(b) 0.0394
(c) 0.0364
(d) 0.0384

Q27. Which of the following statements applies to the Gravitational Force between two bodies?

(a) Gravitational force between two bodies is neutral.
(b) Gravitational force between two bodies can be repulsive or attractive
(c) Gravitational force between two bodies is always attractive
(d) Gravitational force between two bodies is always repulsive

Q28. Difference between selling prices of an article at profits of 5% and 10% is Rs. 30. Then cost price of the article is:

(a) Rs. 600
(b) Rs. 1200
(c) Rs. 500
(d) Rs. 900

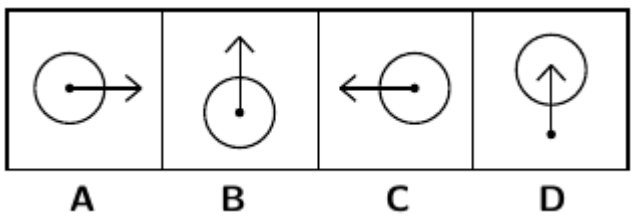
Q29. A _____ material glows with a special colour depending on the nature of gas.

(a) Liquid
(b) Plasma
(c) Solid
(d) Semi-solid

Q30. Name the path-breaking comprehensive digital product of SBI, which was developed using the world's latest digital technilogies.

(a) You Also Need One (YANO)
(b) You Need One (YNO)
(c) You Only Need One (YONO)
(d) You Only Need (YON)

Q31. Find the odd figure out.



(a) B
(b) D

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(c) C
(d) A

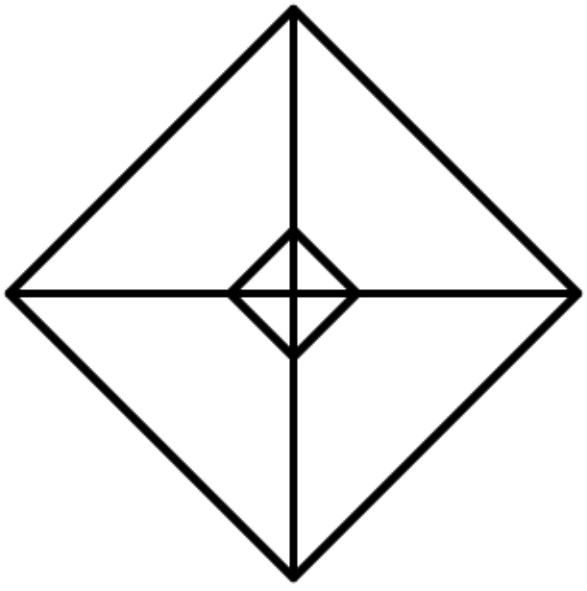
Q32. Which of the following is NOT a democratic country?
(a) China
(b) USA
(c) India
(d) Sri Lanka

Q33. Consider the given statement(s) and decide which of the given assumptions is/are implicit in the statement.
Statement:
"Follow these steps to bring elegance in your dancing," states a dance teacher to a student.
Assumption:
I. Student was not dancing with elegance.
II. Any dance teacher dances elegantly
(a) Neither I nor II is implicit
(b) Only assumption I is implicit
(c) Only assumption II is implicit
(d) Both I and II are implicit

Q34. Vyshnavi is at college at 5 pm. If the hors hand in her watch is pointing towards south-East direction, then what would be the direction of minute's hand?
(a) South
(b) North
(c) West
(d) East

Q35. Add: 1/2 + 1/6 + 1/12 + 1/20 + 1/30 + 1/42
(a) 19 / 21
(b) 6 / 7
(c) 5 / 7
(d) 16 / 21

Q36. Count the number of triangles in the figure.



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

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(d) 18

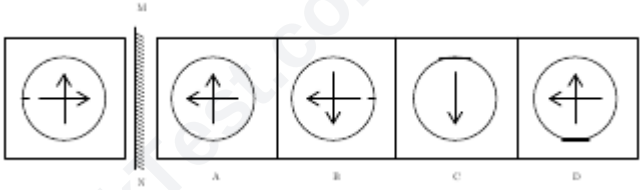
Q37. _____ has specialised tissue for conduction of water.

(a) Fungi
(b) Bryophyta
(c) Gymnosperms
(d) Thallophyta

Q38. Amir Khusro was a famous musician in the court of which emperor?

(a) Shahjahan
(b) Aurangazeb
(c) Jahangir
(d) Alauddin Khilji

Q39. Choose the mirror image for the following figure.

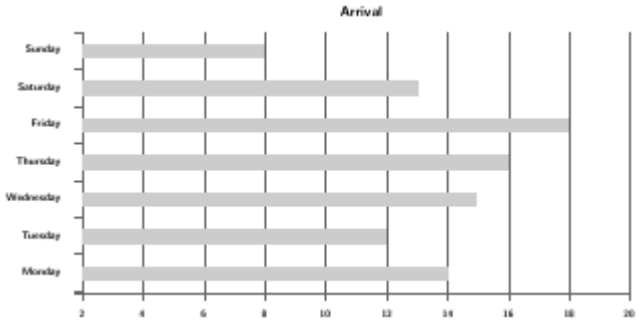


(a) D
(b) B
(c) A
(d) C

Q40. The first major port comissioned in independent India in East coast was _____

(a) Port Blair
(b) Tuticorin Port
(c) Vishakhapatnam Port
(d) Paradip Port

Q41. Based on the given graph, on which day was the number of arrivals the maximum?



(a) Monday
(b) Saturday
(c) Thursday
(d) Friday

Q42. 23 + 3 + 33 + 333 + 3.33 = ?

(a) 395.33
(b) 372.33
(c) 702
(d) 702.33

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Q43. What comes next in the given series:

3J, 6L, 18N, 72P, ?

(a) 369 M
(b) 65G
(c) 250K
(d) 360R

Q44. In a class, there were 24 boys and some girls. In a test the mean score obtained by the boys was 15 while that obtained by the girls was 17. If the overall average was 15.8, what was the total number of students in the class?

(a) 42
(b) 36
(c) 45
(d) 40

Q45. In a triangle angle B = 90° and angle A = 30° then $\sin^2 A - \cos^2 A + \tan^2 A$:

(a) – 3/12
(b) 1/6
(c) 2/6
(d) – 1/6

Q46. Monohybrid cross comprises _____ pair/s of contrasting character.

(a) only two
(b) eight
(c) only one
(d) three

Q47. Pointing to a photograph of a girl Neetha said, “She is the daughter of the only daughter of my father.” How Neetha is related the girl?

(a) Aunt
(b) Cousin
(c) Sister
(d) Mother

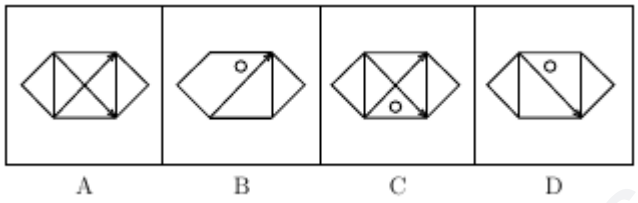
Q48. Which of the following films won the Best Indian Film of the Year award for 2016 at the grand Annual 62^(nd) Jio Filmfare Awards?

(a) Pink
(b) Neerja
(c) Kapoor & Sons
(d) Dangal

Q49. Which of the option figures bears the closest resemblance to the question figure?



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

Q50. If Raghu buys a book for Rs 800 and sells it for Rs. 1,000, then what will be his gain percentage?

(a) 30%
(b) 40%
(c) 25%
(d) 20%

Q51. 15 men finish a job in 21 days by working 8 hour a day. If 3 women work equal to 2 men, then how many days will 21 women take to complete the work by working 6 hours/day?

(a) 22 days
(b) 55 days
(c) 29 days
(d) 30 days

Q52. The square root of 7396 is:

(a) 86
(b) 96
(c) 94
(d) 84

Q53. Which of the following is a Pythagorean triplet?

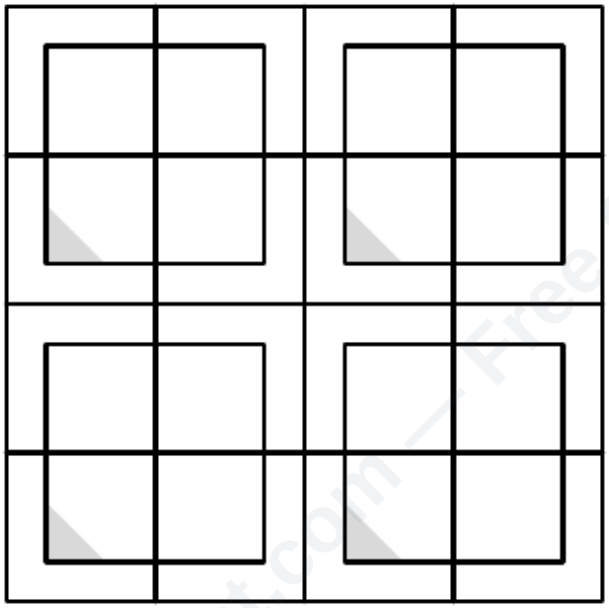
(a) 15, 17, 7
(b) 9, 12, 17
(c) 12, 13, 8
(d) 8, 15, 17

Q54. The difference between Najeeb's and Piyali's ages is 4 years. When they married each other 36 years ago, 5 times Najeeb's age was the same as 6 times Piyali's age. What is the sum of their current ages?

(a) 105 years
(b) 116 years
(c) 112 years
(d) 110 years

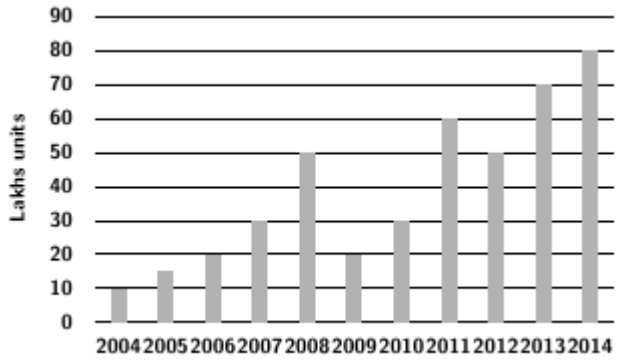
Q55. Find the number of squares in the given figure:

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(a) 52
(b) 48
(c) 46
(d) 50

Q56. The following bar graph shows information about the sales of the personal computers by the company “XYZ” for the last 10 years



How may PC units were sold (in lakhs) by the company in 2005?

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

Q57. The common passage for sperm and urine in human males is _____.

(a) Scrotum
(b) Ureter
(c) Vas deferens
(d) Urethra

Q58. The LCM of 64, 125 and 108 is:

(a) $2^2 \times 3^2 \times 4^3$
(b) $2^2 \times 3^2 \times 5^2$
(c) 2^6 × $5^3 \times 3^3$
(d) $3^2 \times 4^2 \times 5^2$

Q59. Which of the following groups are called 'cryptogamae'?

(a) Thallophyta, Bryophyta and angiosperms
(b) Bryophyta, Peteridophyta and Angiosperms
(c) Gymnosperms, angiosperms and Thallopyta
(d) Thallophyta, Pteridophyta and Bryophyta

Q60. Which of the following options is NOT true of RBCs?

(a) Size - 7.5 µm
(b) Function - Transportation of oxygen and carbon dioxide
(c) RBCs count can be determined by an instrument called haemocytometer.
(d) Shape - Amoeboid or circular

Q61. In which year was Poona Pact signed?

(a) 1912
(b) 1922
(c) 1942
(d) 1932

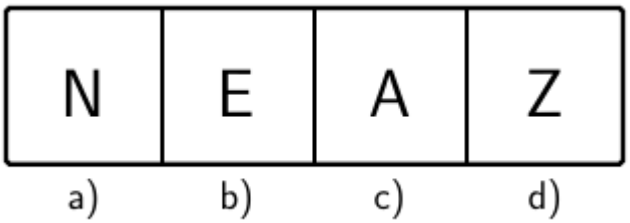
Q62. If A is an acute angle and cosec A = √2, then the value of 4sin2A ÷ secA is:

(a) 2√2
(b) 1/((√2))
(c) 4√2
(d) 4 - √2

Q63. _____ remains unchanged when a sound wave travels in a medium.

(a) Amplitude
(b) Frequency
(c) Speed
(d) Wavelength

Q64. Find the ODD one.



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

Q65. The square root of 3721 is:

(a) 59
(b) 69
(c) 61
(d) 71

Q66. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(s) form the statement(s).

Statement:

All rings are metals

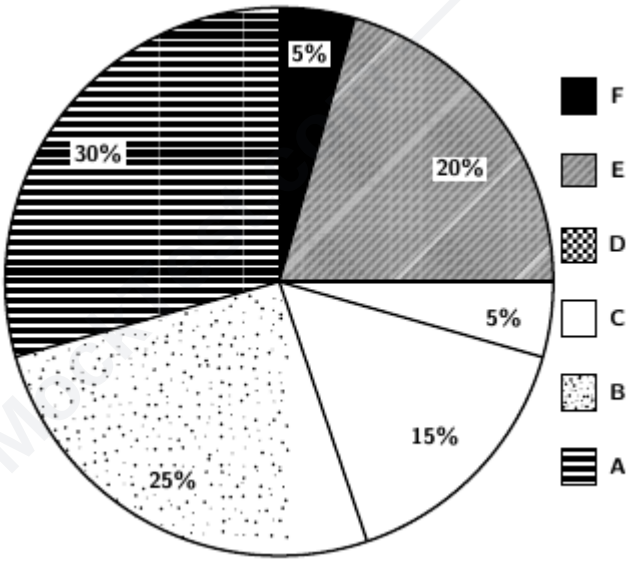
All metals are amalgams.

Conclusions:

1. All rings are amalgams
2. Some amalgams are metals

(a) All the conclusions follow
(b) Only conclusion 2 follows
(c) Only conclusion 1 follows
(d) No conclusion follows

Q67. The following pie diagram shows information about Non Preforming Assets (NPA) processed by the various banks of India till 2017 December. If the total NPA under all the bank is 300 lakh cores, how much NPA does bank 'F; contain (in lakh crores)?



(a) 15
(b) 5
(c) 10
(d) 20

Q68. Read the given statement and action carefully and select the logical action that follows the statement

Statement:

The cargo agents have a huge balance of delivery of goods due to non-provision of cargo space.

Course of Action:

1. Agents must work with airlines to solve this problem
2. To address this problem one should identify the causes of more air exports

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

Q69. Which Indian cabinet minister is currently responsible for National Defence?

(a) A. K. antony
(b) Nirmala Sitharaman
(c) K.C Pant
(d) Manohar Parrikar

Q70. What are jowar, bajra and ragi together known as?

(a) Millets
(b) Pulses
(c) Horticulture

(d) Paddy

Q71. Who was bestowed with the 2018 Padma Bhushan award in the field of Art-Painting?

(a) Laxman Pai
(b) MF Hussain
(c) Nandlal Bose
(d) Jamini Roy

Q72. The charge flowing through a circuit in 10 minutes is 300 C. Find the current drawn by the circuit.

(a) 50 A
(b) 0.05 A
(c) 0.5 A
(d) 5 A

Q73. A number has two digits whose sum is 9. If 27 is added to the number, its digits get interchange. Find the number.

(a) 45
(b) 63
(c) 36
(d) 72

Q74. A tank has two inlets which can fill it in 6 hours and 8 hours respectively. An outlet can empty the full tank in 10 hours. Both inlet taps are opened for an hour and closed. Then the three are opened together the remaining tank fills in:

(a) 515/46 hours
(b) 515/23 hours
(c) 611/46 hours
(d) 316/23 hours

Q75. Find the LCM of x and (x + 3)

(a) $x (x + 3)$
(b) $x^2 (x + 3)$
(c) $(x + 3)$
(d) x

Q76. Which of the following is NOT a part of an anther?

(a) Pollen grains
(b) Anther lobes
(c) Filament
(d) Carpel

Q77. Read the given statements and conclusions carefully and select which of the conclusions logically follow(s) from the statements.

Statements:

Some plastics are wool.

Some wools are papers.

Conclusions:

1. Some plastics are papers
2. Some papers are plastics

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

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Q78. Two cubes each of volume 729 cm^3 are joined end to end. The total surface area of the resulting cuboid is:

(a) 841 cm^2
(b) 729 cm^2
(c) 810 cm^2
(d) 720 cm^2

Q79. Van Mahotsava which means 'the festival of trees' is celebrated in the _____ of July, in India.

(a) first week
(b) third week
(c) last week
(d) second week

Q80. Who won the Sahitya Academy award in Hindi for 'Vishwa Mithak Sarit Sagar'?

(a) Nizam Siddiqui
(b) Satya Prakash Joshi
(c) Ramesh Kuntal Megh
(d) Nasira Sharma

Q81. Which of the following statements is/are true?

A. Rigidity: Mass per unit volume of a substance / matter is known as its rigidity.

B. Kinetic energy: It is the kind of energy present in an object when it is under motion as the particles of that object/matter are continuously moving, which is why matter has kinetic energy.

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

Q82. Force due to which everybody in the universe attract every other body is:

(a) electromagnetic force
(b) nuclear force
(c) repulsive force
(d) force of gravitation

Q83. While white washing, Ca(OH)2 reacts slowly with the _____ in the air to form a thin layer of CaCO3 on the walls.

(a) SO2
(b) CO2
(c) CO
(d) O2

Q84. An object weighs 60 N when measured on the surface of the Earth. What would be its weight on the surface of the Moon?

(a) 10 N
(b) 10 kg
(c) 360 N
(d) 360 KG

Q85. Which of the following is not an electronic configuration of a non-metal?

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

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Q86. 1 Joule = ?

(a) 1 Newton × 1 Meter
(b) 1 Watt × 1 Meter
(c) 1 Erg × 1 Meter
(d) 1 Pascal × 1 Meter

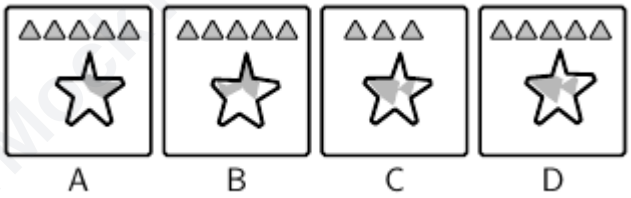
Q87. In a test, Chiradeep secured 57 marks, which was also equivalent to obtaining 76% marks. How many marks was the test out of?

(a) 85
(b) 65
(c) 75
(d) 80

Q88.



Choose the missing figure in the above sequence out of the options given below:



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

Q89. Find the next letter in the series.

W, R, N, K, ?

(a) D
(b) I
(c) G
(d) A

Q90. Which of the below solutions does not conduct electricity?

(a) Glucose
(b) Calcium chloride
(c) Sodium hydroxide
(d) Sodium chloride

Q91. _____ is most commonly formed by reaction of an acid and an alcohol.

(a) Ethanol
(b) Esters
(c) Carboxylic acid
(d) Ketones

Q92. Find the missing term in this series.

Cup: Glass ? Kettle:?

(a) Cauldron
(b) Plate
(c) Boil

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(d) Drink

Q93. Which of the following is NOT a characteristic of sound?

(a) Pitch
(b) Vibration
(c) Loudness
(d) Quality

Q94. What is the 2017 ranking of ace shuttler P.V Sindhu in the latest BWF ranking?

(a) 2^(nd)
(b) 3^(rd)
(c) 4^(th)
(d) 1^(st)

Q95. If the arithmetic mean of two numbers is 7 and the geometric mean of the same two number is 2√10. Then find the numbers x and y respectively, such that x > y.

(a) 4, 10
(b) 2, 5
(c) 5, 2
(d) 10, 4

Q96. Two numbers are in the ration 5 : 4 If their LCM is 180, find the numbers.

(a) 100 and 80
(b) 45 and 36
(c) 63 and 54
(d) 90 and 72

Q97. Two numbers are such that the ratio between them is 4 : 5. If 6 is added to each of them, the ratio between them becomes 11 : 13 The original numbers are:

(a) 25, 45
(b) 16, 20
(c) 10, 18
(d) 5, 9

Q98. At the surface of earth, where air friction is negligible, objects fall with the _____.

(a) same acceleration
(b) same speed
(c) different acceleration
(d) same velocity

Q99. Driving at 60 km/hr Indra reached the destination 3 minutes ahead of time. If he drove at 54 km/hr he would have been 2 minutes late. What is the distance that Indra drove?

(a) 48 km
(b) 49 km
(c) 50 km
(d) 45 km

Q100. How much current will an electric bulb draw a 220 V source if the resistance of the bulb filament is 500 Ohm?

(a) 0.44 A
(b) 4.4 A
(c) 44 A
(d) 40 A

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ANSWER KEY

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

SOLUTIONS

Q1. Answer: (d) [figure]

The mirror image of the above figure with respect to the line AB is,

Hence, option 4 is the correct answer.

Q2. Answer: (c) 7

By decoding given information:

Q	J	T	K
Means			
•	×	•	÷

The given equation is,

40K5Q6J2T13

Replacing the alphabets with signs,

40 ÷ 5 + 6 × 2 - 13 =?

Using BODMAS rule,

8 + 6 × 2 - 13 =?

8 + 12 - 13 =?

20 - 13 = 7

Hence, “7” is the correct answer.

Q3. Answer: (c) Neither 1 nor 2 follows.

The least possible Venn diagram is as follows,

Conclusion 1: All elements are mountains → False (This is definitely false)

Conclusion 2: All elements are Metal → False (This is definitely false)

Hence, “Neither 1 nor 2” follow.

Q4. Answer: (b) Only conclusion II follows

According to the given information,

Conclusion I: This does not follow, because it is not mentioned that the tailor offers home delivery.

Conclusion II: This follows, since the tailor had delayed the order, he offered home delivery.

Hence, “only conclusion II” follows.

Q5. Answer: (b) 2 : 1

- In a molecule of water, hydrogen and oxygen are present in the ratio 2:1(H:O).
- Two atoms of hydrogen combine with one atom of oxygen to form water.

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• Hydrogen was discovered by Henry Cavendish in 1766.
• Oxygen was discovered by Carl Wilhelm Scheele in 1771.
• Oxygen was named by Antoine Lavoisier in 1777.

Q6. Answer: (a) 35°

Shortcut Trick
In ΔACD, exterior angle angle ACB = angle CAD + angle ADC = 72°.
Since AC = CD, then angle CAD = angle ADC = 72° ÷ 2 = 36°.
angle BAC = angle BAD − angle CAD = 109° − 36° = 73°.
In ΔABC, angle ABC = 180° − (angle BAC + angle ACB) = 180° − (73° + 72°) = 35°.
Therefore The correct answer is 35°.
Alternate Method
Given: angle BAD = 109°, angle ACB = 72°, and AC = CD.
Formula Used: Sum of angles in a triangle = 180°; Exterior Angle Theorem; Isosceles Triangle Property (angles opposite to equal sides are equal).
=> In ΔACD, side BC is extended to D, so angle ACB is the exterior angle at vertex C.
=> angle ACB = angle CAD + angle ADC (Exterior angle theorem)
=> 72° = angle CAD + angle ADC
=> Since AC = CD, angle CAD = angle ADC (Angles opposite to equal sides)
=> 2 × angle CAD = 72° => angle CAD = 36°
=> Given angle BAD = 109°, we have angle BAC + angle CAD = 109°
=> angle BAC + 36° = 109° => angle BAC = 73°
=> In ΔABC, angle ABC + angle BAC + angle ACB = 180° (Angle sum property)
=> angle ABC + 73° + 72° = 180°
=> angle ABC + 145° = 180°
=> angle ABC = 180° − 145° = 35°
Therefore The correct answer is 35°.
Additional Information
Exterior Angle Theorem
The measure of an exterior angle of a triangle is equal to the sum of the measures of its two remote interior angles.
Isosceles Triangle Theorem
If two sides of a triangle are congruent, then the angles opposite those sides are congruent.
Angle Sum Property
The sum of the interior angles of any triangle is always 180°.

Q7. Answer: (b) D

The pattern followed is,
M, N and O are alphabets.
Whereas,
'?' is not an alphabet. It is a symbol.
Hence, option 2 is the odd one.

Q8. Answer: (c) Reserve Bank of India (RBI)

• Reserve Bank of India (RBI) launched Financial Literacy Week in June 2018 across the country with customer protection as the main theme.
• The event focused on creating awareness among customers of banks about financial products and services.
• Recently, RBI launched a mobile app "Mobile Aided Note Identifier (MANI)" for aiding visually impaired persons to identify the denomination of Indian Banknotes.
• RBI Founded on 1st April 1935.
• Headquarters: Mumbai.
• Current RBI Governor: Shaktikanta Das.

State Bank of India(SBI)	**• Founded on 1st July 1955 as State Bank of India. - Headquarters: Mumbai. - Current chairman: Rajnish Kumar.**

ICICI Bank	• Founded: June 1994. - Headquarters: Mumbai. - CEO: Sandeep Bakhshi.
Axis Bank	• Founded: 3 December 1993. - Headquarters: Mumbai. - CEO: Amitabh Chaudhry.

Q9. Answer: (b) C

The pattern followed is,

The dots present around the line are opposite to each other in figures A, B and D.

Whereas,

In figure C, they are adjacent to each other.

Hence, option 2 is the odd one.

Q10. Answer: (a) S Vijayalakshmi

The correct answer is S Vijayalakshmi.

Key Points

• Subbaraman Vijayalakshmi is the first female Indian Grandmaster in Chess.

• In 2001, she became the first Indian to achieve the title of Woman Grandmaster (WGM).

• Subbaraman Vijayalakshmi holds the FIDE titles of International Master and Woman Grandmaster,

• In 2001 the Indian government gave her the Arjuna Award.

• Viswanathan Anand was the first grandmaster in chess from India in 1988.

Additional Information

Padmini Rout	**• Indian chess player. - She holds the titles of International Master and Woman Grandmaster. - won the Indian Women's Championship in 2014, 2015, 2016, and 2017.**
Humpy Koneru	• Indian chess player. - Indian chess grandmaster and current(2019) Women's World Rapid Chess Champion. - In 2019, she won Monaco Women's Grand Prix and Skolkovo Women's Grand Prix.
Kruttika Nadig	• Indian chess player. - She holds the title of Woman Grandmaster (WGM) and won the Indian national women's championship in 2008.

Q11. Answer: (c) 10.5

Shortcut Trick

Let Total Work be LCM(18, 21) = 126 units.

Efficiency of (A + B) = 126 ÷ 18 = 7 units/day.

Efficiency of A = 126 ÷ 21 = 6 units/day => Efficiency of B = 7 − 6 = 1 unit/day.

B worked for all 27 days, completing 27 × 1 = 27 units.

Remaining work done by A = 126 − 27 = 99 units. Days A worked = 99 ÷ 6 = 16.5 days.

Days before completion A left = 27 − 16.5 = 10.5 days.

Therefore The correct answer is 10.5 days.

Alternate Method

Person	Days	Total Work	Efficiency
A + B	18	126	126 ÷ 18 = 7
A	21	126 ÷ 21 = 6	

Efficiency Calculation:

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

=> Efficiency of B = 7 − 6 = 1 unit/day

Work Distribution:

=> Total duration of work = 27 days

=> Work done by B in 27 days = 27 × 1 = 27 units

=> Work done by A = Total Work − Work by B = 126 − 27 = 99 units

=> Time for which A worked = 99 ÷ 6 = 16.5 days

=> Days before completion A left = Total days − Days A worked = 27 − 16.5 = 10.5 days

Therefore The correct answer is 10.5 days.

Additional Information

Work and Efficiency

Total Work = Efficiency × Time. Efficiency is inversely proportional to the time taken to complete a task.

Leaving Before Completion

If a person leaves 'n' days before completion, the total work can be expressed as: (Total Time − n) × (Efficiency of leaver) + (Total Time) × (Efficiency of person who stays).

LCM Method

Using the Least Common Multiple of individual time periods as the total work unit simplifies fractional calculations into whole numbers.

Q12. Answer: (b) Velocity

The correct answer is Option 2, i.e Velocity.

• The kinetic energy of an object increase with its velocity.

• The kinetic energy of an object is the energy it has because of its motion.

• Kinetic Energy= 1/2 mv^2

• m → Mass of the object.

• v→ Velocity of the object.

• As per equation, the kinetic energy of an object is directly proportional to the square of its speed.

• When we double the velocity, energy increases by a factor of four.

Q13. Answer: (b) Kabaddi

• Jasvir Singh is an Indian professional Kabaddi player.

• Member of the India national kabaddi team that won the Asian Games Gold medal in 2014 and the World Cup in 2016.

• He awarded the Arjuna award in 2017.

• From 2018 onwards, he is playing for Tamil Thalaivas in the Pro Kabaddi League.

Game	Personality
Cricket	Virat Kohli, M.S Dhoni, Rohit sharma, Jasprit Bumra, Sachin tendulkar, Rishabh Pant.
Shooting	Gagan Narang, Samresh Jung, Vijay Kumar, Abhinav Bindra, Rajyavardhan Singh Rathore.
Hockey	Dhanraj Pillay, Gagan Ajit Singh, Pargat Singh, Dhyan Chand, P.R Sreejesh, Harmanpreet Singh.
Kabaddi	Anup Kumar Ajay Thakur, Rahul Choudhari, Nitin Tomar.

Q14. Answer: (d) Rs. 375

Given:

Percentage expense of Leela on compost = 40%

Amount spent on compost = Rs. 750

Percentage expense of Leela on new plants = 20%

CONCEPT:

Percentage expense on new plants is half of the percentage expense of on compost, i.e. 20%

CALCULATION:

40% = 750

=> 1% = 750 / 40

=> 20% = 18.75 × 20 = Rs. 375

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Q15. Answer: (a) Magahi

• The Magahi language, also known as Magadhi, is a language spoken in Bihar, Jharkhand of eastern India.

• Magahi is an Indo-Aryan language.

• The name Magahi is derived from the word ‘Magadhi’ which was the popular name of the eastern dialect of Apbhransha, fully known as Magadhi Apbhransha.

• It is believed to be the language spoken by Gautama Buddha.

• It was the official language of the Mauryan court.

• Magadhi was legally absorbed under Hindi in the 1961 Census.

Q16. Answer: (c) Only assumption I is implicit

According to the given information,

Assumption I: This is implicit, because of the late arrival, flight will be missed.

Assumption II: This does not follow, because nothing is mentioned about the traffic in the airport route.

Hence, “only assumption I” is implicit.

Q17. Answer: (a) M. Subbarayudu

• M. Subbarayudu has been appointed as the Ambassador of India to the Plurinational State of Bolivia.

• Subbarayudu also the ambassador of India to Lima.

• Bolivia is named after Simón Bolívar, a Venezuelan leader in the Spanish American wars of independence.

• Capital of Bolivia is officially Sucre, while leaving the executive and legislative branches in La Paz.

• Interim president of Bolivia: Jeanine Anez.

Mukta Dutta	**• She is the current Indian Ambassador to Germany.**
Sunil Kumar Lal	• Former Ambassador of India to the Federative Republic of Brazil. - Suresh K. Reddy is the present Ambassador of India to the Federative Republic of Brazil.
CP Ahmad Javed	• Former Indian Ambassador to Saudi Arabia. - Dr. Ausaf Sayeed is the present Ambassador of India to Saudi Arabia.

Q18. Answer: (c) Jammu and Kashmir Peoples Democratic Party

• Mehbooba Mufti, the ex-Chief Minister of Jammu and Kashmir, belongs to which Jammu and Kashmir Peoples Democratic Party.

• She served as the Chief Minister of Jammu and Kashmir from 4 April 2016 to 19 June 2018.

• She was the first and the last woman to hold the office of the Chief Minister in the state Jammu and Kashmir.

• She contested in 2019 Lok Sabha elections from Anantnag seat but lost it to Hasnain Masoodi of National Conference.

• The State of Jammu and Kashmir translated into two Union Territories of J&K and Ladakh on October 31, 2019.

Q19. Answer: (c) Sanskrit

The correct answer is Option 3, i.e Sanskrit.

• The language used in the Upanishads is Sanskrit.

• The Upanishads are ancient Sanskrit texts of spiritual teaching and ideas of Hinduism.

• The Sanskrit term Upanishad translates to "sitting down near", referring to the student sitting down near the teacher while receiving spiritual knowledge.

• The Upanishads are commonly referred to as Vedanta.

• Around 108 Upanishads are known.

• The words 'Satyameva Jayate' inscribed below the base plate of the emblem of India are taken from Mundak Upanishad.

• "Tamaso ma jyotir gamaya" is taken from Brihadaranyaka Upanishad.

Q20. Answer: (c) 21

The number of triangles in the given figure is,

Hence, “21” is the correct answer.

Q21. Answer: (d) Ethane

The correct answer is Ethane.

• Ethane is a saturated hydrocarbon among given options.

Key Points

• Saturated hydrocarbons are molecules with only single bonds.
• Ethane
• Ethene
• Propene
• Acetylene
• Only ethane has all single bond while others have a double and triple bond.
• Methane, Ethane, Propane, Butane, etc are examples of saturated hydrocarbons.
• Alkanes are saturated hydrocarbons and classified as a type of aliphatic hydrocarbon.
• Bonding between every single bond in a saturated hydrocarbon is covalent in nature.

Additional Information

• Unsaturated hydrocarbons contain multiple bonding and contain less than the maximum number of hydrogens per carbon.
• Unsaturated hydrocarbons have double or triple covalent between adjacent carbon atoms.
• Aromatic hydrocarbons are a special case of unsaturated hydrocarbons.

Q22. Answer: (b) Kiran Kanojia

• Kiran Kanojia is popularly known as India's first female blade runner.
• Kiran Kanojia is an Indian para-athlete.
• Kanojia won her first medal at Hyderabad Airtel Marathon In 2014.
• She was selected as one of 12 "sporting superheroes" who featured in a calendar published in 2017 by Mission Smile.
• Winner of Women Transforming India Award 2017, organized by the United Nations and NITI Aayog.

Q23. Answer: (b) 30 J

Given that,

Mass(m) = 15 Kg.

Velocity(v) = 2 ms^(-1).

Using the equation of Kinetic energy,

Kinetic Energy= 1/2 mv^2

Kinetic Energy= 1/2 ×15 × 2^2 = 60/2= 30 J

The kinetic energy possessed by the object will be 30 J.

Q24. Answer: (a) Failure

Pessimist is the antonym of Optimist.

Similarly,

The antonym of Success is Failure.

“Failure” is related to the third term in the same way as the second term is related to the first term.

Hence, “failure” is the correct answer.

Q25. Answer: (c) 25.66 min

Shortcut Trick

Ratio of Efficiency (Fast : Slow) = 6 : 1

Total efficiency = 6 + 1 = 7 units/min

Total Capacity of tank = Total efficiency × Time = 7 × 22 = 154 units

Time taken by Fast pipe = 154 ÷ 6 = 25.66 min

Therefore The correct answer is 25.66 min.

Alternate Method

Pipe Type	Efficiency (Units/min)	Total Work (Units)	Time Taken (min)
Slow Pipe	1	154	154
Fast Pipe	6	25.66	

Given:

Combined time for both pipes = 22 minutes

Efficiency of Fast pipe is 6 times that of Slow pipe.

Calculations:

=> Let efficiency of slow pipe = x

=> Efficiency of fast pipe = 6x

=> Combined efficiency = x + 6x = 7x

=> Total capacity of tank = Combined efficiency × Combined time

=> Total capacity = 7x × 22 = 154x

=> Time for fast pipe = Total capacity ÷ Efficiency of fast pipe

=> Time = 154x ÷ 6x = 154 ÷ 6

=> Time = 25.666... ≈ 25.66 min

Therefore The correct answer is 25.66 min.

Additional Information

Efficiency and Time Relationship

Efficiency is inversely proportional to the time taken to complete a task. If efficiency ratio is a:b, then time ratio is b:a.

Combined Work Formula

If two pipes fill a tank in T1 and T2 time, then combined time T = (T1 × T2) ÷ (T1 + T2).

Pipes and Cisterns Basics

Filling pipes are considered positive work, while leakage or outlet pipes are considered negative work.

Q26. Answer: (d) 0.0384

GIVEN:

Fraction value = 4.8 / 125

CALCULATION:

4.8 / 125

=> 384 / 10000 i.e 0.0384

Therefore 4.8 / 125 = 0.0384

Q27. Answer: (c) Gravitational force between two bodies is always attractive

The correct answer is Option 3.

Key Points

• The gravitational force between two bodies is always attractive.

• The gravitational force is a force that attracts any two objects with mass.

• Gravitational force is the weakest of all the forces in the universe.

• The acceleration of gravity on the surface of the earth at sea level is 9.8 ms^(-2).

• The value of the acceleration due to gravity, on the moon, is 1.625 ms^(-2).

• The value of acceleration due to gravity at the center of the earth is zero.

• Newton's law of universal gravitation states that every point mass in the universe attracts every other point mass with a force that is directly proportional to the product of their masses, and inversely proportional to the square of the distance between them.

• The value of gravitational constant G is 6.673×10-11 N m² kg^(-2)

Q28. Answer: (a) Rs. 600

Shortcut Trick

Difference in Profit Percentage = 10% − 5% = 5%.

This 5% difference in Selling Price corresponds to Rs. 30.

Using Unitary Method: If 5% => Rs. 30, then 1% => 30 ÷ 5 = Rs. 6.

Total Cost Price (100%) => 6 × 100 = Rs. 600.

Therefore The correct answer is Rs. 600.

Alternate Method

Given: Profit1 = 5%, Profit2 = 10%, Difference in SP = Rs. 30.

Formulas: SP = CP × (100 + Profit%) ÷ 100 | Difference = SP2 − SP1

=> Let the Cost Price (CP) be Rs. x.

=> SP1 at 5% profit = x × (105 ÷ 100) = 1.05x.

=> SP2 at 10% profit = x × (110 ÷ 100) = 1.10x.

=> Difference = 1.10x − 1.05x = 0.05x.

=> Given 0.05x = 30.

=> x = 30 ÷ 0.05 = 3000 ÷ 5 = 600.

Therefore The correct answer is Rs. 600.

Additional Information

Cost Price vs Selling Price

When an article is sold at a profit, SP = CP + Profit. When it is sold at a loss, SP = CP − Loss.

Profit Percentage Difference

If two different profit percentages P1% and P2% are given on the same CP, the difference in SP is simply (P2 − P1)% of the CP.

Q29. Answer: (b) Plasma

• A plasma material glows with a special colour depending on the nature of the gas.
• Plasma is the 4th state of matter.
• Plasma was first described by chemist Irving Langmuir.
• Fluorescent tube and neon sign bulbs consist of plasma.
• Stars (including the Sun) are mostly made of plasma.
• It consists of super-energetic and super-excited particles.

Solid	**• In a solid, molecules are packed together, and it keeps its shape. - The branch of physics that deals with solids is called solid-state physics.**
Liquid	• Only state with a definite volume but no fixed shape. - Liquid particles have more space between them, so they are not fixed in position.

Q30. Answer: (c) You Only Need One (YONO)

• You Only Need One (YONO) is the path-breaking comprehensive digital product of SBI, which was developed using the world's latest digital technologies.
• YONO is an integrated Omni-channel digital platform that offers just about everything related to financial services and lifestyle products.
• Initial release date: 24 November 2017.
• Launched by former Finance Minister of India, Arun Jaitley.
• SBI is ranked 236th in the Fortune Global 500 list of the world's biggest corporations of 2019.
• Chairman of SBI: Rajnish Kumar.
• Headquarters: Mumbai.

Q31. Answer: (b) D

The pattern followed is,

The figure is rotated anti clock – wise by one place.

All follow the same pattern, except figure D, in which the arrow is facing inside.

Hence, option 2 is the odd one.

Q32. Answer: (a) China

• China is not a democratic country in the given options.
• Only the Communist Party is allowed to rule in China (democracy is not followed in the real sense.)
• China is officially called the People's Republic of China.
• It is the world's most populous country, with a population of around 1.4 billion in 2019.
• China's political system was based on hereditary monarchies, or dynasties.
• Beijing is the capital of China.
• Xi Jinping is the Party General Secretary and President of China.

USA	**• The American Constitution came into effect from March 4, 1789. - The Constitution, originally comprising seven articles and t has been amended 27 times. - President: Joe Biden**

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India	• Indian Constitution was adopted by the Constituent Assembly on 26 November 1949 and became effective on 26 January 1950. - B. R. Ambedkar, chairman of the drafting committee is considered to be its chief architect. - India is the most populous democracy in the world.
Sri Lanka	• Sri Lanka's current constitution stipulates it as a republic and unitary state governed by a semi-presidential system. - President:Ranil Wickremesinghe - Prime Minister: Dinesh Chandra Rupasinghe Gunawardena

Q33. Answer: (b) Only assumption I is implicit

According to the given information,

Assumption I: This is implicit because it is mentioned that the teacher asked the student to include some steps to bring elegance, it means the student is not dancing with elegance.

Assumption II: This is not implicit, because it is not mentioned that every teacher dances elegantly.

Hence, “only assumption I is implicit."

Q34. Answer: (b) North

Drawing the diagram according to the given information,

The direction of minute’s hand is towards the north.

Hence, “north” is the correct answer.

Q35. Answer: (b) 6 / 7

CALCULATION:

Considering the given statement

1/2 + 1/6 + 1/12 + 1/20 + 1/30 + 1/42

Adding the statement we get,

1/2 + 1/6 + 1/12 + 1/20 + 1/30 + 1/42 = 6/7

Alternate Solution:

LCM of 2,6,12,20,30,42 is 420

210/(2× 210) + 70/(6× 70) + 35/(12× 35) + 21/(20× 21) + 14/30×14 + 10/42×10

(210 + 70 + 35 + 21 + 14 + 10)/420

=> 360/420

=> 6/7

Alternate Method

1/2 + 1/6 + 1/12 + 1/20 + 1/30 + 1/42

=> 1/(1 × 2) + 1/(2 × 3) + 1/(3 × 4) + 1/(4 × 5) + 1/(5 × 6) + 1/(6 × 7)

=> 1/1 - 1/2 + 1/2 - 1/3 + 1/3 - 1/4 + 1/4 - 1/5 + 1/5 - 1/6 + 1/6 - 1/7 = ?

=> (1/1) - (1/7) = ?

=> 6/7 = ?

Therefore The value of ? is 6/7.

Q36. Answer: (b) 16

The number of triangles in the given figure is,

Hence, “16” is the correct answer.

Q37. Answer: (c) Gymnosperms

Concept:

Gymnosperms:

- They have specialized tissue for the conduction of water.
- The gymnosperms are naked seed-bearing plants that include conifers, Ginkgo, and gnetophytes.
- The word Gymnosperms literally means "naked seeds".
- Both the xylem and phloem are present in the gymnosperms.
- The xylem conducts water and minerals from the roots to the rest of the plant and also provides structural support.

Bryophyta	**• Bryophytes are a group of plant species that reproduce via spores rather than flowers or seeds. - There are three main types of bryophytes: mosses, liverworts, and hornworts. - The term Bryophyta was first suggested by Braun.**
Fungi	• Member of the group of eukaryotic organisms that includes microorganisms such as yeasts and molds. - Fungi do not photosynthesize. - Mycology is the branch of biology concerned with the study of fungi.
Thallophyta	• Thallophyta A former division of the plant kingdom containing relatively simple plants. - Traditionally described as "thalloid plants", - Thallophytes have a hidden reproductive system. - They are autotrophic in nature.

Q38. Answer: (d) Alauddin Khilji

Correct Answer Alauddin Khilji

Key Points:

• Amir Khusro was a famous musician in the court of Alauddin Khalji (Lived in the courts of as many as 7 different rulers of the Delhi Sultanate)

• .Amīr Khusrau was a Sufi singer, poet, and scholar from India.

• Khusrau is also referred to as the "Voice of India" or "Parrot of India"

• Sitar is said to have been invented by Amir Khusrow.

• His work Khaliq-e-bari, which is known as the oldest printed dictionary in the world deals with Hindi and Persian words.

Shahjahan	**• His original name was Shahab-ud-din Muhammad Khurram. - Fifth Mughal emperor, who reigned from 1628 to 1658. - The Taj Mahal in Agra was built by Shahjahan. - English merchant-traveler Peter Mundy and French traveler Tavernier visited India during the reign of Shah Jahan**
Aurangazeb	• The sixth Mughal emperor ruled over almost the entire Indian subcontinent for a period of 49 years. - Bibi Ka Maqbara was commissioned by Emperor Aurangzeb in 1660 in memory of his wife Dilras Banu Begum. - Jizya (tax on non-Muslims) was reimposed during the reign of Aurangzeb.
Jahangir	• His original name was Nur-ud-din Muhammad Salim. - Fourth Mughal Emperor, who ruled from 1605 until his death in 1627. - Thomas Roe, ambassador of the English King, James 1 visited India during Jahangir's tenure.

Q39. Answer: (c) A

The mirror image of the given figure is,

Hence, option 3 is the correct answer.

Q40. Answer: (d) Paradip Port

• The first major port comissioned in independent India in the east coast was the Paradip port in Odisha.

• It was commissioned in 1966.

Q41. Answer: (d) Friday

GIVEN:

Arrival numbers are given in graph:

Sunday = 8

Saturday = 13

Friday = 18

Thursday = 16

Wednesday = 15

Tuesday = 12

Monday = 14

CALCULATION:

Friday = 18 has the maximum arrival.

Q42. Answer: (a) 395.33

Shortcut Trick

Group the whole numbers and decimals separately.

Whole numbers: 23 + 3 + 33 + 333 + 3 = 395

Decimal part: 0.33

Total = 395 + 0.33 = 395.33

Therefore The correct answer is 395.33.

Alternate Method

Given: 23, 3, 33, 333, 3.33

Method: Column Addition (Align by decimal point)

=> 23.00

=> 03.00

=> 33.00

=> 333.00

=> 03.33

=> Sum = 395.33

Therefore The correct answer is 395.33.

Additional Information

BODMAS Rule

Always follow the order of operations: Brackets, Orders, Division, Multiplication, Addition, and Subtraction.

Decimal Alignment

When adding or subtracting decimal numbers, always align the numbers vertically by their decimal points to avoid place value errors.

Simplification Shortcut

For series like 3 + 33 + 333, use the formula 3/9 × (10^(n+1) − 10 − 9n) for quick summation if applicable.

Q43. Answer: (d) 360R

The pattern followed here is,

Hence, “360R” is the correct answer.

Q44. Answer: (d) 40

Shortcut Trick

Using the Alligation Method, the ratio of Boys to Girls is:

(17 − 15.8) : (15.8 − 15) = 1.2 : 0.8 = 3 : 2

Since 3 units correspond to 24 boys, 1 unit = 8.

The number of girls (2 units) = 2 × 8 = 16.

Total Students = 24 + 16 = 40.

Therefore The correct answer is 40 students.

Alternate Method

Given:

Number of boys = 24 | Mean score of boys = 15

Mean score of girls = 17 | Overall average = 15.8

Formula Used:

Overall Average = [(n1 × x1) + (n2 × x2)] ÷ (n1 + n2)

Calculations:

Let the number of girls be n.

=> 15.8 = [(24 × 15) + (n × 17)] ÷ (24 + n)

=> 15.8 × (24 + n) = 360 + 17n

=> 379.2 + 15.8n = 360 + 17n

=> 17n − 15.8n = 379.2 − 360

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=> 1.2n = 19.2
=> n = 19.2 ÷ 1.2 = 16
=> Total number of students = 24 + 16 = 40
Therefore The correct answer is 40 students.
Additional Information
Weighted Average Principle
When two groups with averages A1 and A2 are mixed, the combined average lies between A1 and A2.
Alligation Rule
Ratio of quantities = (Higher Value − Mean) : (Mean − Lower Value). This is a shortcut for weighted average problems.
Mean Stability
The sum of deviations of all observations from their mean is always zero: ∑(x_i − Mean) = 0.

Q45. Answer: (d) – 1/6

Shortcut Trick
Directly substitute angle A = 30° into the expression: $\sin^2 30° - \cos^2 30° + \tan^2 30°$.
Value substitution: $(1/2)^2 - (\sqrt{3}/2)^2 + (1/\sqrt{3})^2$
Calculation: 1/4 − 3/4 + 1/3 = − 2/4 + 1/3 = − 1/2 + 1/3 = − 1/6.
Therefore The correct answer is − 1/6.
Alternate Method
Given: In triangle ABC, angle B = 90° and angle A = 30°.
Formula Used: Standard trigonometric values: sin 30° = 1/2, cos 30° = √3/2, tan 30° = 1/√3.
The expression to evaluate is $\sin^2 A - \cos^2 A + \tan^2 A$.
=> Expression = $(\sin 30°)^2 - (\cos 30°)^2 + (\tan 30°)^2$
=> Expression = $(1/2)^2 - (\sqrt{3}/2)^2 + (1/\sqrt{3})^2$
=> Expression = 1/4 − 3/4 + 1/3
=> Expression = (1 − 3)/4 + 1/3
=> Expression = − 2/4 + 1/3
=> Expression = − 1/2 + 1/3
=> Expression = (− 3 + 2)/6
=> Expression = − 1/6
Therefore The correct answer is − 1/6.
Additional Information
Trigonometric Identities
Fundamental identities include $\sin^2\theta + \cos^2\theta = 1$ and $1 + \tan^2\theta = \sec^2\theta$.
Double Angle Relation
The term $(\sin^2 A - \cos^2 A)$ is equal to $-(\cos^2 A - \sin^2 A)$, which simplified is $-\cos 2A$.
Standard Values at 30°
For θ = 30°: sin θ = 0.5, cos θ = 0.866, tan θ = 0.577.

Q46. Answer: (c) only one

- Monohybrid cross comprises only one pair of contrasting character.
- A monohybrid cross is a cross between two organisms with different variations at one genetic chromosome of interest.
- In a monohybrid cross, each parent is chosen to be homozygous or true breeding for a given trait.
- Monohybrid cross is responsible for the inheritance of one gene.
- Gregor Mendel theorized the basic rules of inheritance.

Q47. Answer: (d) Mother

According to the given information,
Neetha is the mother to the girl.
Hence, “mother” is the correct answer.

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Q48. Answer: (d) Dangal

• Dangal won the Best Indian Film of the Year award for 2016 at the Grand Annual 62nd Jio Filmfare Awards.
• The grand Annual 62nd Jio Filmfare Awards event organized by the Filmfare magazine was held in Mumbai, Maharashtra.
• Neerja and Kapoor & Sons won 5 awards each and became the film winning the highest number of awards.
• Best Actor: Aamir Khan (Dangal).
• Best Actress: Alia Bhatt (Udta Punjab).
• Best Director: Nitesh Tiwari (Dangal).
• Film Pink won the National Film Award(2017) for Best Film on Other Social Issues.

Q49. Answer: (c) C

In the given figure there are two arrows and a circle.
In image C also there are two arrows and a circle.
Whereas,
The other figures are different.
Hence, option 3 resembles the given image.

Q50. Answer: (c) 25%

Shortcut Trick
Ratio of Cost Price (CP) to Selling Price (SP) = 800 : 1000 = 4 : 5.
Profit in ratio units = 5 − 4 = 1 unit.
Gain percentage = (Profit ÷ CP) × 100 = (1 ÷ 4) × 100 = 25%.
Therefore The correct answer is 25%.
Alternate Method
Given: Cost Price (CP) = Rs. 800, Selling Price (SP) = Rs. 1,000.
Formulas: Profit = SP − CP | Profit% = (Profit ÷ CP) × 100
=> Profit = 1,000 − 800 = Rs. 200.
=> Gain Percentage = (200 ÷ 800) × 100.
=> Gain Percentage = (1 ÷ 4) × 100 = 25%.
Therefore The correct answer is 25%.
Additional Information
Profit and Loss Basics
Profit occurs when SP > CP. Loss occurs when CP > SP. Both percentages are always calculated on the Cost Price unless stated otherwise.
Fraction Conversion
Common fractions like 1/4 = 25%, 1/5 = 20%, and 1/8 = 12.5% are helpful for quick calculations in Profit and Loss problems.

Q51. Answer: (d) 30 days

Shortcut Trick
Convert women to men: 21 women × (2 men / 3 women) = 14 men.
Apply M1D1H1 = M2D2H2 formula.
15 × 21 × 8 = 14 × D2 × 6
D2 = (15 × 21 × 8) ÷ (14 × 6) = 2520 ÷ 84 = 30 days.
Therefore The correct answer is 30 days.
Alternate Method
Given: 15 Men (M1), 21 Days (D1), 8 Hours (H1). For the second case: 21 Women (W), 6 Hours (H2). Efficiency ratio: 3 Women = 2 Men.
Formula Used: M1 × D1 × H1 × E1 = M2 × D2 × H2 × E2
=> Let efficiency of a Man (E_M) be 3 and Woman (E_W) be 2 (since 3 × 2 = 2 × 3).
=> Total Work = 15 × 21 × 8 × 3
=> Work done by 21 women in D2 days = 21 × D2 × 6 × 2
=> 15 × 21 × 8 × 3 = 21 × D2 × 6 × 2
=> 7560 = 252 × D2
=> D2 = 7560 ÷ 252

=> D2 = 30 days

Therefore The correct answer is 30 days.

Additional Information

Chain Rule Formula

Used for comparing two work scenarios: (M1D1H1)/W1 = (M2D2H2)/W2, where M is persons, D is days, H is hours, and W is work.

Efficiency Substitution

When different types of workers (Men, Women, Children) are involved, convert them to a single unit using the given work-equivalence ratio.

Inverse Proportion

Number of workers is inversely proportional to the time taken. If workers increase, days decrease, provided work remains constant.

Q52. Answer: (a) 86

Shortcut Trick

Identify the range: 802 = 6400 and 902 = 8100. So, √7396 lies between 80 and 90.

Check the unit digit: The number 7396 ends in 6, so the square root must end in 4 or 6.

Possible answers are 84 or 86. Since 7396 is closer to 8100 (902) than 6400 (802), the answer is 86.

Therefore The correct answer is 86.

Alternate Method

Given: Number = 7396

Method: Long Division Method

=> Grouping the digits in pairs from right to left: 73 and 96.

=> Largest square less than or equal to 73 is 82 = 64.

=> Subtracting 64 from 73 gives 9. Bringing down the next pair 96 makes the new dividend 996.

=> Doubling the divisor 8 gives 16. We find a digit 'x' such that (160 + x) × x ≤ 996.

=> Testing x = 6: 166 × 6 = 996.

=> Remainder is 0, so the square root is 86.

Therefore The correct answer is 86.

Additional Information

Unit Digit Rule for Squares

If a perfect square ends in 6, its square root must end in either 4 or 6. If it ends in 1, the root ends in 1 or 9.

Perfect Square Identification

A number ending in 2, 3, 7, or 8 can never be a perfect square.

Estimation Method

For a number N, if x2 < N < (x+1)2, the square root lies between x and x+1.

Q53. Answer: (d) 8, 15, 17

The solution is in Hindi. Read it online.

Q54. Answer: (b) 116 years

Shortcut Trick

Age difference remains constant at 4 years.

Ratio of Najeeb's age (N) to Piyali's age (P) 36 years ago: 5N = 6P => N : P = 6 : 5.

Difference in ratio parts = 6 − 5 = 1 unit → 4 years.

Sum of ratio parts 36 years ago = 6 + 5 = 11 units → 11 × 4 = 44 years.

Sum of current ages = Sum then + (2 × 36) = 44 + 72 = 116 years.

Therefore The correct answer is 116 years.

Alternate Method

Given: Current age difference = 4 years. 36 years ago, 5 × Najeeb's age = 6 × Piyali's age.

Formula Used: Age difference is constant over time. Sum of current ages = (Age N_(then) + 36) + (Age P_(then) + 36).

=> Let Najeeb's age 36 years ago be N and Piyali's be P.

=> N − P = 4 (Since difference never changes).

=> 5N = 6P => N = 6P/5.

=> (6P/5) − P = 4 => P/5 = 4 => P = 20 years.

=> N = 20 + 4 = 24 years.

=> Current age of Najeeb = 24 + 36 = 60 years.

=> Current age of Piyali = 20 + 36 = 56 years.

=> Sum = 60 + 56 = 116 years.

Therefore The correct answer is 116 years.

Additional Information

Constant Age Difference

The difference between the ages of two people remains the same regardless of how many years pass or go back.

Ratio and Proportion in Ages

If the ratio of ages is a : b and the difference is D, then one part of the ratio is equal to D ÷ (a − b).

Sum of Ages Change

If 'n' years pass, the sum of the ages of 'k' people increases by (n × k) years.

Q55. Answer: (d) 50

The number of squares in the given figure is,

Hence, “50” is the correct answer.

Q56. Answer: (d) 15

CALCULATION:

From the given bar graph we can say that

Number of PC sold in 2005 were 15 lakhs

Q57. Answer: (d) Urethra

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

• In males, urethra serves as the common passage for urine and sperm to be discharged.

• It is a tube that connects the urinary bladder to the urinary meatus for the removal of the urine from the body.

• In human females and other primates, the urethra connects to the urinary meatus above the vagina.

• Females use their urethra only for urinating.

• Scrotum is the bag of skin that holds and helps to protect the testicles.

• The ureters are tubes made of smooth muscle fibers that propel urine from the kidneys to the urinary bladder.

• The vas deferens is a long, muscular tube that travels from the epididymis into the pelvic cavity, to just behind the bladder and helps to transport mature sperm to the urethra.

Q58. Answer: (c) 2^6 × 5³ × 3³

Shortcut Trick

Identify the Prime Factors of each number and take the highest power of all prime bases present.

64 = 2^6

125 = 5³

108 = 2² × 3³

LCM = Max power of (2, 3, 5) = 2^6 × 3³ × 5³

Therefore The correct answer is 2^6 × 5³ × 3³.

Alternate Method

Given: Numbers are 64, 125, and 108.

Formula Used: LCM is the product of the highest powers of all prime factors involved in the numbers.

=> Prime factorization of 64: 2 × 2 × 2 × 2 × 2 × 2 = 2^6

=> Prime factorization of 125: 5 × 5 × 5 = 5³

=> Prime factorization of 108: 2 × 2 × 3 × 3 × 3 = 2² × 3³

=> Prime factors involved are 2, 3, and 5.

=> Highest power of 2 = 2^6

=> Highest power of 3 = 3³

=> Highest power of 5 = 5³

=> LCM = $2^6 \times 3^3 \times 5^3$

Therefore The correct answer is $2^6 \times 5^3 \times 3^3$.

Additional Information

LCM (Least Common Multiple)

The smallest positive integer that is divisible by each of the given numbers.

HCF (Highest Common Factor)

The largest positive integer that divides each of the given numbers without a remainder. Product of lowest powers of common prime factors.

Relation between LCM and HCF

For two numbers a and b: a × b = LCM(a, b) × HCF(a, b).

Q59. Answer: (d) Thallophyta, Pteridophyta and Bryophyta

The correct answer is Option 4, i.e Thallophyta, Pteridophyta and Bryophyta.

• The groups of thallophytes, bryophytes and pteridophytes are called as cryptogamae.

• They have naked embryos that are called spores.

• The reproductive organs of plants in all these three groups are not clearly visible, and they are therefore called cryptogamae.

• A Cryptogamae is a plant that reproduces by spores, without flowers or seeds.

• The meaning of Cryptogamae is "hidden reproduction".

Q60. Answer: (d) Shape - Amoeboid or circular

• Option 4 is wrong here, the Shape of RBC isn't Amoeboid or circular.

• Shape of Red Blood Cells are biconcave discs with very shallow centers.

• RBC is also called erythrocytes.

• The main function of RBC is the transportation of oxygen and carbon dioxide.

• In humans, mature red blood cells are flexible and oval biconcave disks.

• Hemoglobin is present in RBC.

• RBCs are produced in the bone marrow and destroyed in the spleen.

• Spleen is the organ known as the graveyard of RBC.

Q61. Answer: (d) 1932

The correct answer is 1932.

• Poona Pact signed in the year 1932.

• The reason for the Poona Pact was the Communal Award of August 1932 which provided a separate electorate for depressed classes.

• Poona pact signed between Dr. B R Ambedkar and Gandhiji.

• Poona pact signed on September 24, 1932, at Yerwada Jail in Pune.

• Madan Mohan Malaviya signed it on behalf of upper-caste Hindus and Gandhi.

• Ambedkar signed on behalf of depressed classes.

• The final outcome of Poona pact was 147 electoral seats.

Q62. Answer: (a) 2√2

Shortcut Trick

Given that cosec A = √2 and A is an acute angle.

Since cosec 45° = √2, we get A = 45°.

Substitute A = 45° in the given expression: $4\sin^2A \div \sec A$

=> $4\sin^2(45°) \div \sec(45°) = 4 \times (1/\sqrt{2})^2 \div \sqrt{2} = 4 \times (1/2) \div \sqrt{2} = 2 \div \sqrt{2} = \sqrt{2}$

Multiply and divide by √2 to match option values: $2/\sqrt{2} = \sqrt{2} = 2/\sqrt{2} = 2\sqrt{2}/2$?

Let us re-verify: $4\sin^2A \div \sec A = (4 \times (1/\sqrt{2})^2) / \sqrt{2} = (4 \times 1/2) / \sqrt{2} = 2 / \sqrt{2} = \sqrt{2}$. The option (1) is $2\sqrt{2}$, which might be a typo in the question's standard options or the expression is $4\sin^2A \times \sec A$? If $4\sin^2A \times \sec A$, then $4 \times (1/2) \times \sqrt{2} = 2\sqrt{2}$.

Assuming the standard question has multiplication or option 1 represents the evaluated form of $4\sin^2A \times \sec A$, the value is $2\sqrt{2}$.

Therefore The correct answer is $2\sqrt{2}$.

Alternate Method

Given: cosec A = √2, where A is an acute angle.

Formula Used:

sin A = 1 ÷ cosec A

cos A = √(1 − sin²A)

sec A = 1 ÷ cos A

=> cosec A = √2 / 1

=> sin A = 1/√2

=> cos A = √(1 − (1/√2)²) = √(1 − 1/2) = 1/√2

=> sec A = √2

=> Expression = 4sin²A × sec A

=> Value = 4 × (1/√2)² × √2

=> Value = 4 × (1/2) × √2

=> Value = 2√2

Therefore The correct answer is 2√2.

Additional Information

Trigonometric Ratios of 45°

For A = 45°, sin A = 1/√2, cos A = 1/√2, tan A = 1, cot A = 1, sec A = √2, cosec A = √2.

Fundamental Identities

sin²θ + cos²θ = 1, sec²θ − tan²θ = 1, cosec²θ − cot²θ = 1.

Q63. Answer: (b) Frequency

The correct answer is Option 2, i.e Frequency.

• Frequency remains unchanged when a sound wave travels in a medium.

• When a sound wave travels in a medium, its velocity and wavelength changes but there is no change in frequency of the wave.

• The velocity depends on the nature of the medium.

• When velocity changes, wavelength also changes.

• Frequency remains unchanged because it is like a driven oscillation and maintains the frequency of the original source. It is not dependent on the medium of propagataion and hence remains unchanged.

• Sound travels faster in solids.

• Sound travels slower in gases.

• The unit of frequency of sound is Hertz(Hz).

Q64. Answer: (c) B

The pattern followed is,

N, A, Z are formed with three lines, while E is formed with four lines.

Hence, “E” is the odd one.

Q65. Answer: (c) 61

Shortcut Trick

3721 lies between 60² (3600) and 70² (4900).

The unit digit of 3721 is 1, so the square root must end in either 1 or 9.

Since 3721 is very close to 3600, the answer is 61.

Therefore The correct answer is 61.

Alternate Method

Given: Number = 3721

Method: Long Division / Prime Factorisation

=> Grouping digits from right: 37 and 21.

=> Finding nearest square to 37: 6 × 6 = 36.

=> Remainder = 1, bring down 21 to get 121.

=> Double the divisor 6 to get 12. Find x such that 12x × x ≤ 121.

=> 121 × 1 = 121.

=> √3721 = 61.

Therefore The correct answer is 61.

Additional Information

Unit Digit Rule

If a perfect square ends in 1, its square root ends in 1 or 9. If it ends in 4, the root ends in 2 or 8.

Perfect Squares Near 60

$60^2 = 3600$, $61^2 = 3721$, $62^2 = 3844$, $65^2 = 4225$.

Q66. Answer: (a) All the conclusions follow

The least possible Venn diagram is as follows,

Conclusion 1: All rings are amalgams → True (This is definitely true)

Conclusion 2: Some amalgams are metals → True (This is definitely true)

Hence, “all conclusions” follow.

Q67. Answer: (a) 15

GIVEN:

Total NPA = 300 lakh crore.

Bank F contains = 5% of 300

CALCULATION:

Total percentage of all the bank = 100%

=> 100% = 300 lakh

=> 1% = 3 lakh

=> 5% = 15 Lakh

Therefore NPA bank F contains = 15 Lakh

Q68. Answer: (a) Only 1 follows

According to the given information,

Course of action 1: This follows, because agents must work together with airlines and solve the problem of huge balance of delivery of goods.

Course of action 2: This does not follow, since now the important task is to solve the problem, rather than to identify the cause.

Hence, “only 1” follows.

Q69. Answer: (b) Nirmala Sitharaman

- Nirmala Sitharaman was a former Indian cabinet minister.
- Rajnath Singh is serving as the present Defence Minister(17th Lok sabha) of India
- Nirmala Sitaraman served as the Defence Minister of India in 16th Lok sabha (2017 – 2019).
- Currently, she is serving as Minister of Finance and Corporate Affairs of India in 17th Lok sabha.
- Nirmala Sitharaman is India's second female defence minister and also the second female finance minister after Indira Gandhi.

A K Antony	**• Served as 23rd Defence Minister of India(2006-2014). - He holds the record of the longest served defence minister of India. - He is the current Member of Parliament in the Rajya Sabha.**
K.C Pant	• 18th Defence Minister of India (1987-1989). - Appointed as the Chairman of the 10th Finance Commission by Prime Minister Narsimha Rao.
Manohar Parrikar	• Served as the Minister of Defence(2014 to 2017). - In January 2020, he was posthumously awarded Padma Bhushan. - Served as Chief Minister of Goa from 2017 until his death(2019).

Q70. Answer: (a) Millets

The correct answer is Millets.

Important Points

- Jowar, Bajra, and Ragi are together known as Millets.
- Millets are a group of highly variable small-seeded grasses.
- Millets can see everywhere as cereal crops or grains for fodder and human food.
- The most widely grown millet is pearl millet.
- In 2016, the global production of millet was 28.4 million tonnes, led by India with 36% of the world total.

Additional Information

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Pulses	**Bengal Gram, Pigeon Peas, Turkish/dew gram beans, garden peas, chana.**
Horticulture	Banana, Mangos, Orange, Grapes, Guava, Pineapple.

Q71. Answer: (a) Laxman Pai

• Laxman Pai was bestowed with the 2018 Padma Bhushan award in the field of Art-Painting.
• Laxman Pai is an Indian artist and painter.
• Honoured with Padma Shri awards in 1985.
• Won Gomant Vibhushan Award(2016), Goa's highest civilian award.
• Ajoy Chakrabarty bestowed with the 2020 Padma Bhushan award in the field of Art.

M F Hussain	**• Indian artist. - Founding member of Bombay Progressive Artists' Group. - He was nominated to the Rajya Sabha in 1986. - Padma Bhushan (1973).**
Nandlal Bose	• One of the pioneers of modern Indian art and a key figure of Contextual Modernism. - The original manuscript of the Constitution of India decorated by him. - The emblems of Bharat Ratna and Padmashri sketched by Nandalal bose
Jamini Roy	• Indian painter. - Honoured with Padma Bhushan in 1955. - On 11 April 2017 Google India dedicated a Google Doodle to celebrate Roy on his 130th birthday.

Q72. Answer: (c) 0.5 A

Given,
Charge (Q)= 300 C.
Time (t)= 10 minutes = 10 × 60 =600 seconds.
Using equation,
Charge(Q)= Current (i) × Time(t)
Current(i)= (Charge(Q))/(Time(t))=300/600= 0.5 A
Therefore Current drawn by the circuit.is 0.5 A.

Q73. Answer: (c) 36

Shortcut Trick
Check options for Sum of Digits = 9 and Difference = Adding Value ÷ 9.
Sum: 4+5=9, 6+3=9, 3+6=9, 7+2=9 (All satisfy).
Difference between digits = 27 ÷ 9 = 3.
The number increases when 27 is added, so the unit digit must be greater than the tens digit by 3.
In 36, 6 − 3 = 3. Also 36 + 27 = 63 (Digits interchanged).
Therefore The correct answer is 36.
Alternate Method
Given: Let the tens digit be x and unit digit be y.
=> Original number = 10x + y
=> Sum of digits: x + y = 9 --- (i)
=> Number with interchanged digits = 10y + x
=> According to question: (10x + y) + 27 = 10y + x
=> 9y − 9x = 27
=> y − x = 3 --- (ii)
=> Adding (i) and (ii): 2y = 12 → y = 6
=> Substituting y in (i): x + 6 = 9 → x = 3
=> Original number = 10(3) + 6 = 36
Therefore The correct answer is 36.
Additional Information
Digit Difference Rule

The difference between a two-digit number and the number formed by reversing its digits is always divisible by 9, and the quotient is the difference between the digits: (10x+y) − (10y+x) = 9(x−y).

Digit Sum Rule

The sum of a two-digit number and the number formed by reversing its digits is always divisible by 11: (10x+y) + (10y+x) = 11(x+y).

Interchanging Digits

If the added value is positive, the unit digit is greater than the tens digit (y > x). If the added value is negative, the tens digit is greater (x > y).

Q74. Answer: (d) 316/23 hours

Shortcut Trick

Total Capacity (LCM of 6, 8, 10) = 120 units.

Efficiencies: A = 20, B = 15, C = −12.

Work done in 1st hour by A & B = 20 + 15 = 35 units.

Remaining work = 120 − 35 = 85 units.

Combined efficiency (A + B + C) = 20 + 15 − 12 = 23.

Time taken = 85 ÷ 23 = 3^(16)/23 hours.

Therefore The correct answer is 3^(16)/23 hr.

Alternate Method

Tap	Time (hr)	Total Work	Efficiency
Inlet 1 (A)	6	120 units	20
Inlet 2 (B)	8	15	
Outlet (C)	10	−12	

Step 1: Calculate work done in the first hour.

=> Work done by A and B in 1 hour = Efficiency of (A + B) × Time

=> Work done = (20 + 15) × 1 = 35 units

Step 2: Calculate remaining work to be filled.

=> Remaining Capacity = Total Capacity − Filled Capacity

=> Remaining Capacity = 120 − 35 = 85 units

Step 3: Calculate time for the three taps working together.

=> Combined Efficiency = 20 + 15 − 12 = 23 units/hr

=> Time required = Remaining Capacity ÷ Combined Efficiency

=> Time = 85 ÷ 23 = 3^(16)/23 hours

Therefore The correct answer is 3^(16)/23 hr.

Additional Information

Pipes and Cisterns Efficiency

Inlet pipes have positive efficiency as they fill the tank, while outlet pipes have negative efficiency as they empty it.

Total Work Concept

The total capacity of the tank is always taken as the Least Common Multiple (LCM) of the individual times taken by the pipes to make calculations easier.

Work & Wages Relation

Wages are distributed based on the ratio of work done, which is Efficiency × Time for each participant.

Q75. Answer: (a) x (x + 3)

Shortcut Trick

For any two prime or co-prime algebraic expressions that share no common factors, their LCM is simply their product.

Since x and (x + 3) are irreducible algebraic factors with no common terms (HCF = 1), they are co-prime.

LCM = Product of terms = x × (x + 3).

Therefore The correct answer is x(x + 3).

Alternate Method

Given: Two expressions x and (x + 3).

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Formula Used: LCM × HCF = Product of two numbers/expressions.
=> Factor 1 = x
=> Factor 2 = (x + 3)
=> Common factors (HCF) = 1
=> LCM = (Product of expressions) ÷ HCF
=> LCM = [x × (x + 3)] ÷ 1
=> LCM = x(x + 3)
Therefore The correct answer is x(x + 3).
Additional Information
LCM of Algebraic Expressions
The Least Common Multiple (LCM) is the product of the highest powers of all prime factors involved in the expressions.
Relation between HCF and LCM
For any two polynomials P(x) and Q(x), P(x) × Q(x) = HCF(P,Q) × LCM(P,Q).
Co-prime Expressions
If two expressions have no common numerical or algebraic factor other than 1, their HCF is 1 and their LCM is their product.

Q76. Answer: (d) Carpel

The correct answer is Option 4, i.e Carpel.
• Carpel is NOT a part of an anther.
• Pollen grains, Anther lobs, and Filament are the parts of the anther.
• Anther is the part of a stamen that contains the pollen.
• The stamen is the male reproductive organ of a flower.
• The stamen has two parts: Anther and stalk (filament).
• Collectively the stamens form the androecium.
• Carpel is the female reproductive organs in a flower, composed of an ovary, a style, and a stigma.

Q77. Answer: (c) Neither 1 nor 2 follows

The least possible Venn diagram is as follows,
Conclusion 1: Some plastics are papers → False (This is definitely false)
Conclusion 2: Some papers are plastics → False (This is definitely false)
Hence, “neither 1 nor 2” follow.

Q78. Answer: (c) 810 cm²

Shortcut Trick
Side of cube a = √729 = 9 cm.
When two cubes are joined, two faces (one from each cube) are hidden.
Total Surface Area = 2 × (6a²) − 2a² = 10a².
TSA = 10 × (9)² = 10 × 81 = 810 cm².
Therefore The correct answer is 810 cm².
Alternate Method
Given: Volume of each cube = 729 cm³.
Formula Used: Volume of cube = a³; TSA of cuboid = 2(lb + bh + hl).
=> Side of cube (a) = ³√729 = 9 cm.
=> For the resulting cuboid:
=> Length (l) = 9 + 9 = 18 cm.
=> Breadth (b) = 9 cm.
=> Height (h) = 9 cm.
=> TSA = 2(18×9 + 9×9 + 9×18)
=> TSA = 2(162 + 81 + 162) = 2(405) = 810 cm².
Therefore The correct answer is 810 cm².
Additional Information
Volume of Cuboid
The amount of space occupied by a cuboid is given by Length × Breadth × Height (l × b × h).

Lateral Surface Area (LSA)

LSA of a cuboid is the area of the four side walls, excluding top and bottom: 2h(l + b).

Diagonal of a Cuboid

The longest rod that can be placed inside a cuboid is $\sqrt{(l^2 + b^2 + h^2)}$.

Q79. Answer: (a) first week

• Van Mahotsava which means 'the festival of trees' is celebrated in the first week of July, in India.

• It is celebrated for a week from 1st July to 7th July In India since 1950.

• One week tree-planting Van Mahotsava festival in India was started by Kanaiyalal Maneklal Munshi.

• Aim of van Mahotsava is to spread the importance of growing and saving our forests and create awareness about the adverse effects of deforestation.

Q80. Answer: (c) Ramesh Kuntal Megh

• Ramesh Kuntal Megh won the Sahitya Academy award (2016) in Hindi for 'Vishwa Mithak Sarit Sagar'.

• Ramesh Kuntal Megh is a writer and critic of Hindi literature.

• In 2016, he was awarded the Sahitya Akademi Award for Hindi for his literary criticism 'Vishwa Mithak Sarit Sagar'(World Myth Sarit Sagar).

• Important works of Ramesh Kuntal are: Because time is a word, Myths and Dreams, Tulsi: from modern ventilation.

Nizam Siddiqui	**• Urdu writer. - Won the 2016 Sahitya Akademi Award for Urdu for his literary critique Mabad-e-Jadidiat Se Naye Ahed Ki Takhliqiyat Tak.**
Satya Prakash Joshi	• Rajasthani writer. - Won the 1977 Sahitya Akademi Award for Rajasthani for his poetry work Bol Bharamli.
Nasira Sharma	• Hindi writer. - She won a Sahitya Akademi Award(2016) for her novel Paarijat. - Vyas Samman for her novel Kagaz ki naav in 2019.

Q81. Answer: (b) Only B is true

Only B is true.

• Kinetic energy is the kind of energy present in an object when it is under motion as the particles of that object/matter are continuously moving, which is why matter has kinetic energy is the correct statement.

• Kinetic Energy= 1/2× Mass × $(\text{Velocity})^2$

• The mass per unit volume of a substance is called density NOT rigidity.

• Density=Mass/Volume

• Rigidity is the property exhibited by the solid to change in its shape.

Q82. Answer: (d) force of gravitation

The correct answer is the force of gravitation.

Key Points

• Force due to which everybody in the universe attracts every other body is the force of gravitation.

• Gravitational force is the weakest force in nature.

• The gravitational force was discovered by sir Issac Newton.

• The gravitational force between two masses is always attractive.

• The gravitational force is minimum at the equator and maximum at the poles.

Additional Information

Force	**Detail**
Nuclear force	• The force that acts between the protons and neutrons of atoms. - The strongest force on Earth and in the universe.
Electromagnetic force	• Force present between the charged particles and a combination of magnetic and electrical forces. - Electromagnetism is a branch of physics involving the study of electromagnetic force.
Repulsive force	• The force by which bodies repel one another.

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Q83. Answer: (b) CO2

• While whitewashing, Ca(OH)2 reacts slowly with the CO2in the air to form a thin layer of CaCO3 on the walls.

• While white wasting Calcium hydroxide (Ca(OH)2) reacts slowly with the carbon dioxide (CO2) in the air to form a thin layer of calcium carbonate (CaCO3) formed after two to three days of whitewashing and gives a shiny finish to the walls.

• Ca(OH)2 + CO2 <=> CaCO3 + H2O

• Calcium carbonate is the chemical name of marble/limestone.

• Calcium hydroxide, also called slaked lime.

Q84. Answer: (a) 10 N

Given that,

Weight of the object on the earth surface(W_e) = 60 N.

Using the concept,

Weight of the object on the moon surface(W_m) = 1/6 × Weight of the object on the earth surface(W_e)

Therefore W_m= 1/6 × 60= 10 N

Object weights 60 N on the surface of the earth will experience a weight of 10 N on the surface of the moon.

Q85. Answer: (c) 2, 8, 4

• 2, 8, 4 is not an electronic configuration of a non-metal in given options.

• 2, 8, 4 is the electronic configuration of Silicon (Si).

• Silicon is neither metal nor non-metal; it's a metalloid.

• Silicon is the second most abundant element in the Earth's crust (about 28% by mass) after oxygen.

Chlorine	**• 2, 8, 7 is the electronic configuration of Chlorine (Atomic number= 17). - Non-metal from Halogen family. - Chlorine has the highest electron affinity and the third-highest electronegativity.**
Sulfur	• 2, 8, 6 is the electronic configuration of Sulfur (Atomic number= 16). - Non-metal. - Sulfur is used in the vulcanization of rubber.
Phosphorus	• 2, 8, 5 is the electronic configuration of Phosphorus (Atomic number= 15). - Non-metal - Discoverd by Hennig Brand (1669). - Recognised as an element by Antoine Lavoisier in 1777.

Q86. Answer: (a) 1 Newton × 1 Meter

• 1 Joule = 1 Newton × 1 Mete

• 1 Joule is defined as the work done or energy transferred to an object when a one Newton force acts on it over one meter.

• Joule is the SI unit of energy/work.

• The joule is named after the English physicist James Prescott Joule.

• In terms of other SI units, a joule is defined: $J=(Kg.m^2)/(s^2)=N.m=Pa.m^3=W.s=C.V$

Meaning of the symbols

Symbol	Meaning
Kg	Kilogram.
m	Meter.
s	Second.
N	Newton.
Pa	Pascal.
W	Watt.
C	Coulomb.
V	Volt.

Q87. Answer: (c) 75

Shortcut Trick

According to the question, 76% corresponds to 57 marks.

Using the unitary method: 1% = 57 ÷ 76 = 0.75.

Total marks (100%) = 0.75 × 100 = 75 marks.

Therefore The correct answer is 75 marks.

Alternate Method

Given:

Marks secured by Chiradeep = 57

Percentage of marks = 76%

Formula Used:

Total Marks = (Obtained Marks ÷ Percentage Marks) × 100

Calculations:

=> Let the total marks of the test be 'x'.

=> 76% of x = 57

=> (76 ÷ 100) × x = 57

=> x = (57 × 100) ÷ 76

=> x = (3 × 100) ÷ 4

=> x = 3 × 25

=> x = 75

Therefore The correct answer is 75 marks.

Additional Information

Percentage Change

Percentage change = (Difference ÷ Original Value) × 100. Useful for comparing growth or reduction.

Fraction to Percentage Conversion

To convert a fraction to a percentage, multiply it by 100. Example: 3/4 × 100 = 75%.

Base Change in Percentage

If A is x% more than B, then B is [x ÷ (100 + x)] × 100% less than A.

Q88. Answer: (c) D

The pattern followed is,

The painted sides of the stars are moving anti clock – wise by one place starting from the first figure and the number of diamonds on the top of the star image keeps on increasing from one in the first figure.

The figure which will come next in the pattern is,

Hence, option 3 is the correct answer.

Q89. Answer: (b) I

The pattern followed here is,

W - 5 = R;

R - 4 = N;

N - 3 = K;

K - 2 = I

Hence, “I” is the correct answer.

Q90. Answer: (a) Glucose

• Glucose solution does not conduct electricity among the given options.

• Conduction of electricity happens in a substance only if it contains charged particles (electrons/ions) that are free to move around.

• Glucose is an organic compound which forms strong covalent bonds, because of this, it does not dissociate in water to form free-floating electrons which are allowing a charge to flow.

• Glucose is the most abundant monosaccharide.

• Calcium chloride, Sodium hydroxide, Sodium chloride solutions will conduct electricity.

• Both acidic and basic solutions in water conduct electricity (Acids, will release the H+ and bases release the OH- ions).

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Q91. Answer: (b) Esters

The correct answer is Esters.

Key Points

• Esters are most commonly formed by the reaction of an acid and an alcohol.

• Esters are formed by the condensation reaction between an alcohol and a carboxylic acid and this process is known as esterification.

• The word ester was coined in 1848 by a German chemist Leopold Gmelin.

• Examples of esters: Ethyl ethanoate, Ethyl propanoate, Propyl methanoate, and Methyl butanoate.

Additional Information

Ethanol	**• Also called ethyl alcohol/grain alcohol/drinking alcohol. - Ethanol is also used as an alternative fuel source.**
Carboxylic acid	• An organic acid containing a carboxyl group. - Examples: Methanoic(formic) acid and ethanoic(acetic) acid.
Ketones	• The substance produced when body cells don't get enough glucose and the body will burns fat for energy instead. - The simplest ketone is acetone.

Q92. Answer: (a) Cauldron

Cups and glasses are containers used for drinking fluids.

Similarly,

Kettles and Cauldrons are devices with lid and handle, generally used for boiling water.

Hence, “cauldron” is the correct answer.

Q93. Answer: (b) Vibration

• Vibration is NOT a characteristic of sound among given options.

• Pitch, Quality, and Loudness are all characteristics of sound.

• Sound is defined as vibrations that travel through the air or another medium as an audible mechanical wave.

• Sound is a longitudinal wave that consists of compressions and rarefactions traveling through a medium.

• SI unit of sound that is used is Decibel (dB).

• The sound frequency at which a human can hear ranges between 20Hz to 20kHz.

Pitch	**• Pitch is the highness or lowness of a sound. - Depends on the frequency of vibration of the waves. - Voice of a woman has a high pitch than that of a man.**
Loudness	• Loudness is the response of the ear to the sound. - Depends on the energy of the wave.

Q94. Answer: (b) 3^(rd)

• Ace shuttler PV Sindhu has been ranked No. 3 in the BWF ranking 2017.

• In April 2017, she achieved a career-high world ranking of number 2.

• As per the latest updates(March 2020) she is on world no. 7.

• She won gold at the 2019 World Championships.

• She is the first Indian to become the Badminton World Champion.

• She has won a silver medal each at the 2018 Commonwealth Games and 2018 Asian Games.

• She was also honoured with Padma Bhushan, the award, in January 2020.

• In April 2020, she was elected as one of the ambassadors of the BWF Committee's campaign – "I am Badminton" to promote clean and fair play in the sport.

Q95. Answer: (d) 10, 4

Shortcut Trick

The Sum of two numbers is 2 × Arithmetic Mean = 2 × 7 = 14.

The Product of two numbers is (Geometric Mean)² = $(2\sqrt{10})^2$ = 4 × 10 = 40.

Find two numbers whose sum is 14 and product is 40: 10 and 4 (since 10+4=14 and 10×4=40).

Given x > y, therefore x = 10 and y = 4.

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Therefore The correct answer is 10, 4.
Alternate Method
Given: Arithmetic Mean (AM) = 7 and Geometric Mean (GM) = 2√10.
Formula Used: AM = (x + y) / 2 and GM = √(xy).
=> (x + y) / 2 = 7 => x + y = 14
=> √(xy) = 2√10 => xy = $(2\sqrt{10})^2$ = 40
=> Using the Quadratic Equation form: t^2 − (Sum)t + (Product) = 0
=> $t^2 - 14t + 40 = 0$
=> $t^2 - 10t - 4t + 40 = 0$
=> t(t − 10) − 4(t − 10) = 0 => (t − 10)(t − 4) = 0
=> The roots are 10 and 4. Since x > y, x = 10 and y = 4.
Therefore The correct answer is 10, 4.
Additional Information
Relationship between AM and GM
For any two positive numbers, the Arithmetic Mean is always greater than or equal to the Geometric Mean (AM ≥ GM).
Quadratic Equation from Roots
If the sum of roots is S and the product of roots is P, the equation is given by $x^2 - Sx + P = 0$.
Harmonic Mean (HM)
The Harmonic Mean of x and y is given by 2xy / (x + y). The relation between means is $GM^2 = AM \times HM$.

Q96. Answer: (b) 45 and 36

Shortcut Trick
Let the ratio be 5 : 4 and HCF be x.
LCM = Product of Ratios × HCF
180 = 5 × 4 × x => 180 = 20x => x = 9.
Numbers = 5 × 9 and 4 × 9 = 45 and 36.
Therefore The correct answer is 45 and 36.
Alternate Method
Given: Ratio = 5 : 4, LCM = 180.
Formula Used: Product of two numbers = HCF × LCM
Let the numbers be 5x and 4x.
=> LCM of 5x and 4x is 20x.
=> 20x = 180
=> x = 180 ÷ 20 = 9
=> First number = 5 × 9 = 45
=> Second number = 4 × 9 = 36
Therefore The correct answer is 45 and 36.
Additional Information
Product Rule
The product of two numbers is always equal to the product of their HCF and LCM (a × b = HCF × LCM).
Ratio and LCM Relation
If two numbers are in the ratio a : b, then their LCM is (a × b × HCF).
Co-prime Numbers
For co-prime numbers, the HCF is 1 and the LCM is simply the product of the numbers.

Q97. Answer: (b) 16, 20

Shortcut Trick
Initial Ratio = 4 : 5 (Gap between parts = 1)
Final Ratio = 11 : 13 (Gap between parts = 2)
To equalize the gap, multiply the Initial Ratio by 2 → 8 : 10
Increase in ratio for both numbers = 11 − 8 = 3 parts (and 13 − 10 = 3 parts)
Since 6 is added to each number, 3 parts = 6 => 1 part = 2

Original numbers = 8 × 2 = 16, and 10 × 2 = 20.

Therefore The correct answer is 16, 20.

Alternate Method

Given:

Initial ratio of the two numbers = 4 : 5

Number added to each = 6

Final ratio of the two numbers = 11 : 13

Calculations:

=> Let the original numbers be 4x and 5x.

=> According to the given condition, when 6 is added to each number:

=> (4x + 6) / (5x + 6) = 11 / 13

=> Cross-multiplying the equation:

=> 13 × (4x + 6) = 11 × (5x + 6)

=> 52x + 78 = 55x + 66

=> 55x − 52x = 78 − 66

=> 3x = 12

=> x = 4

=> The first number = 4x = 4 × 4 = 16

=> The second number = 5x = 5 × 4 = 20

Therefore The correct answer is 16, 20.

Additional Information

Cross-Multiplication in Ratios

When two ratios are equal (a / b = c / d), they form a proportion, and their cross products are equal: a × d = b × c.

Balancing Ratio Differences

If the same constant is added to both parts of a ratio, the difference between the terms must remain constant. Multiplying ratios by suitable integers helps balance these differences efficiently without complex algebra.

Componendo and Dividendo

A fundamental theorem on proportions stating that if a / b = c / d, then (a + b) / (a − b) = (c + d) / (c − d). This rule is widely used for simplifying complex rational equations.

Q98. Answer: (a) same acceleration

The correct answer is Option 1, i.e Same acceleration.

• At the surface of the earth, where air friction is negligible, objects fall with the same acceleration.

• If air resistance and friction are negligible, then in a given location all objects fall toward the center of Earth with the same constant acceleration, independent of their mass.

• In free-fall conditions only force acting upon an object is gravity.

• The acceleration of free-falling objects is therefore called the acceleration due to gravity.

• Acceleration due to gravity of earth is 9.8 ms^(-2).

Q99. Answer: (d) 45 km

Shortcut Trick

Distance = [Product of speeds ÷ Difference of speeds] × Total time difference

Speeds are 60 km/hr and 54 km/hr. Time difference = 3 min (early) + 2 min (late) = 5 minutes.

Distance = [60 × 54] ÷ [60 − 54] × [5 ÷ 60] hours

Distance = [3240 ÷ 6] × [1 ÷ 12] = 540 ÷ 12 = 45 km.

Therefore The correct answer is 45 km.

Alternate Method

Given: S1 = 60 km/hr, S2 = 54 km/hr, Δt = 5 minutes = 5/60 hours.

Formula: Distance = (S1 × S2) ÷ (S1 − S2) × Δt

=> D = (60 × 54) ÷ (60 − 54) × (5 ÷ 60)

=> D = 3240 ÷ 6 × 1 ÷ 12

=> D = 540 ÷ 12

=> D = 45 km

Therefore The correct answer is 45 km.

Additional Information

Time-Speed Inversely Proportional Rule

When distance is constant, speed is inversely proportional to time (S1/S2 = T2/T1). Ratio of speeds 60:54 = 10:9 → Ratio of times = 9:10.

Total Time Difference Calculation

If one case is early and the other is late, add the times. If both are late or both are early, subtract the times.

Average Speed Formula

For two equal distances covered at speeds x and y, Average Speed = 2xy ÷ (x + y).

Q100. Answer: (a) 0.44 A

Given that,

Voltage(V) = 220 V.

Resistance(R) = 500 Ω.

Using Ohm's law,

Voltage(V)= Current(I) × Resistance (R)

I=V/R=220/500= 0.44 A.

Therefore The bulb will draw 0.44 A current.

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