RRC Group D Previous Year Paper 3 (Held On: 19 Sep 2018 Shift 1)

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

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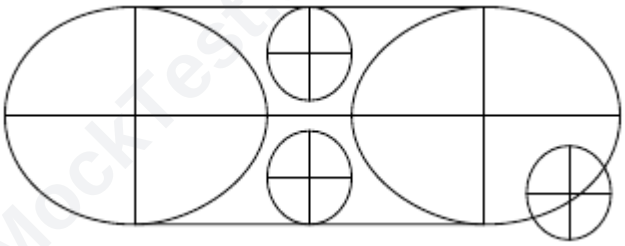
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CBT

Q1. How many minor sectors are there in the following figure?



(a) 24
(b) 20
(c) 32
(d) 16

Q2. Which party won the highest number of seats in the Manipur Legislative Assembly Elections held in 2017?

(a) Lok Jan Shakti Party
(b) Bharatiya Janata Party
(c) Aam Aadmi Party
(d) Indian National Congress

Q3. Select the term that is related to the third term in the same way that the second term relates to the first term.

Wrist : Watch ? Finger : ?

(a) Ring
(b) Joint
(c) Nail
(d) Thumb

Q4. Find the next term in the following series.

33, 38, 48, 53, ?

(a) 58
(b) 54
(c) 63
(d) 60

Q5. The height and the slant height of a right circular cone are given as $3\sqrt{23}$ cm and 16 cm respectively. Approximating π by 22/7, find the curved surface area of the same cone.

(a) 328 cm^2
(b) 339 cm^2
(c) 352 cm^2
(d) 372 cm^2

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Q6. Which one of the below is not true about diffusion?

(a) Rate of diffusion of gases is higher than that of liquids or solids
(b) Diffusion is possible only when particles of matter move continuously
(c) Rate of diffusion of gases depends on their volume
(d) Diffusion is a movement of particles from higher concentration to lower concentration

Q7. Name the process in which a metal is attacked by substances around it such as moisture and acids etc.

(a) Oxidation
(b) Corrosion
(c) Rancidity
(d) Reduction

Q8. In December 2017, who was conferred with the National Design Award?

(a) G. Satheesh Reddy
(b) G. Shanthi Reddy
(c) G. Ganesh Reddy
(d) G. Shankar Reddy

Q9. Power is defined as _____.

(a) Rate of doing work or rate of transfer of energy
(b) Work done in one minute
(c) Force applied to increase weight
(d) Work done in the transfer of energy

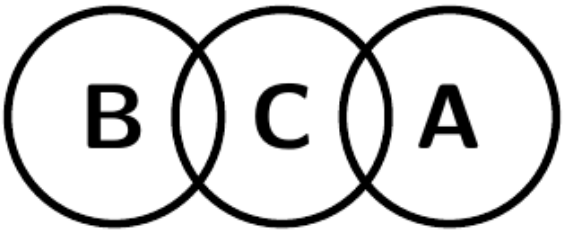
Q10. Jallianwala Bagh Massacre event took place in the year _____.

(a) 1920
(b) 1981
(c) 1919
(d) 1891

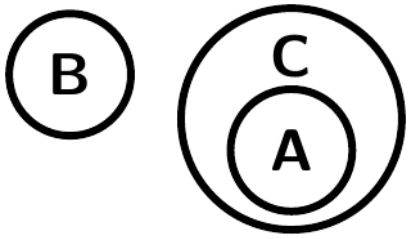
Q11. Which of the following Venn diagrams correctly represents the relationship between the given classes?

A. Carrots
B. Cabbages
C. Vegetables

(a)

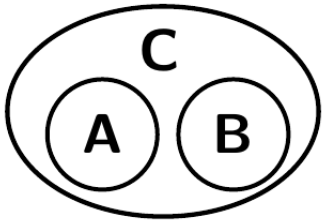


(b)



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(c)



(d)



Q12. On 23rd January 2018, who was appointed as the Chief Election Commissioner of India?

(a) Ashok Lavasa
(b) Om Prakash Rawat
(c) Sunil Arora
(d) Sunil Rawar

Q13. Consider the following question and statements and decide which of the statements is sufficient to answer the question.

What is the total weight of six boxes? Each of them is equal in weight.

Statements:

A. One-third of each boxes' weight is 2 kg

B. The total weight of four boxes is 12 kg more than the total weight of two boxes.

(a) Both Statements 1 and 2 alone are sufficient
(b) Statement A alone is sufficient
(c) Statement B alone is sufficient
(d) Neither statement A or B are sufficient

Q14. In a ΔABC, D, E and F are the mid-points of the sides BC, CA and AB, respectively. BE and DF intersect at X. DE and CF intersect at Y. Find XY.

(a) BC/2
(b) BC/4
(c) 2BC/3
(d) BC/3

Q15. How many atoms are present in one mole of copper?

(a) 6.022 × 10^(24)
(b) 6.022 × 10^(25)
(c) 6.022×10^{22}
(d) 6.022×10^{23}

Q16. 119 ÷ [22 - {90 ÷ (23 - 105 ÷ (7 × 3))}] = ?

(a) 4
(b) 12
(c) 3
(d) 7

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Q17. Who coined the word ‘atom’?

(a) Democritus
(b) Thomson
(c) E Rutherford
(d) John Dalton

Q18. Nina starts cycling early in the morning in the opposite direction to the sun. She then turns left, travels for 1 km and again turns left. Towards which direction is she moving?

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

Q19. The substances whose odour changes in acidic or basic media are called _____.

(a) Olfactory indicators
(b) Synthetic indicator
(c) Acid-base indicators
(d) natural indicators

Q20. Consider the following statement and conclusions and decide whether the conclusions logically follow from the statements.

Statement:

1. All rocks are minerals
2. All minerals are ores

Conclusions:

1. All rocks are ores
2. All minerals are rocks

(a) Only conclusion 2 follows
(b) Only conclusion 1 follows
(c) Both the conclusions follow
(d) Neither of the conclusions follows

Q21. Calculate the momentum of a gun of mass 400 kg when it recoils with a velocity of 0.25 ms^(-1).

(a) 100 kg.ms²
(b) 100 kg.ms^(-1)
(c) 100 kg.ms^(-3)
(d) 100 kg.ms¹

Q22. Sooraj is three times as old as his son Arjun. After 8 years, he would be two and a half times of Arjun’s age. After another 8 years, he would be _____ times Arjun’s age.

(a) 2
(b) 21/2
(c) 3
(d) 21/5

Q23. In a certain code, TEAM is written as WHDP. How will COINS be written as in that code?

(a) QJPTU
(b) FRLBZ
(c) FRLQV
(d) RVJQL

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Q24. -15 - (-18 - 35 ÷ 5) = ?

(a) 10
(b) -14
(c) -2
(d) 6

Q25. Which of the following does NOT oxidise (Burn) readily at high temperatures?

(a) Alloys
(b) Insulators
(c) Conductors
(d) Semi-conductors

Q26. The LCM of 14, 42 and 77 is:

(a) 154
(b) 462
(c) 168
(d) 308

Q27. Consider the given statement to be true even if it seems to be at variance with the commonly known facts and decide which of the given conclusions logically follow(s) from the statement.

Statement:

Some Lemons are Red.

Some Beet are Lemons.

Conclusions:

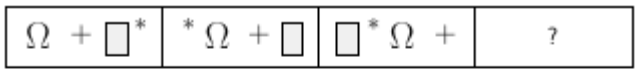
1. Some Lemons are Jump.
2. Beet is a Red.

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

Q28. The South Asian Sports Council (SASC) was formed in the year _____.

(a) 1975
(b) 1987
(c) 1979
(d) 1983

Q29. Which figure follows next?





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

Q30. After spending 85% of his salary, Alok saves Rs. 1200 per month. What is his monthly salary?

(a) Rs. 8,000
(b) Rs. 10,000
(c) Rs. 8,500

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(d) Rs. 12,000

Q31. Who was the first British Viceroy of India?

(a) Lord Canning
(b) Lord Wellesley
(c) William Bentinck
(d) Robert Clive

Q32. What is the difference between the compound interest and the simple interest on a sum of Rs. 4500 for 3 years at the rate of 8% per annum?

(a) Rs. 87.70
(b) Rs. 87.50
(c) Rs. 85.70
(d) Rs. 88.70

Q33. A triangle with vertices (4, 1), (1, 1), (3, 5) is a/an:

(a) Isosceles and right-angled triangle
(b) Scalene triangle
(c) Isosceles but not right-angled triangle
(d) Right-angled but not isosceles triangle

Q34. On 7th June 1984 it was a Thursday. What day was it on 7th June 1983?

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

Q35. Apple introduced the iPad as a multimedia device in the year _____.

(a) 2008
(b) 2009
(c) 2010
(d) 2011

Q36. The product of force and displacement is called _____.

(a) Work
(b) Weight
(c) Acceleration
(d) Momentum

Q37. Which of the below is not a part of 5-Kingdom classification by Whittaker?

(a) Animalia
(b) Protista
(c) Fungi
(d) Protozoa

Q38. If '+' is denoted as '-' and '×' is denoted as '÷' then what is the value of ((25 + 30) × 5) × 10)

(a) 1
(b) -0.1
(c) 0.1
(d) 0

Q39. Which of the fractions given below, when added to 5/16, gives 1?

(a) 6/8
(b) 11/32
(c) 22/32

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(d) 13/2

Q40. The first 'Persons of Indian Origin (PIO) Parliamentarian Conference' was held in _____.

(a) 2 April 2017
(b) 19 January 2016
(c) 9 January 2018
(d) 11 July 2014

Q41. Himanshi bought a t-shirt at 20% discount on its marked price but sold it at the marked price. What is the gain or loss percent on the whole transaction?

(a) 15% gain
(b) 15% loss
(c) 25% gain
(d) 25% loss

Q42. An object is placed in front on a concave mirror at a point between its focus and centre of curvature. The image formed will be _____.

(a) Real and inverted
(b) Real and erect
(c) Virtual and inverted
(d) Virtual and erect

Q43. A 10-kg object is moving at a speed of 5 m/s. The kinetic energy of the object will be ____.

(a) 2 J
(b) 25 J
(c) 50 J
(d) 125 J

Q44. Which of the following is a simple permanent tissue?

(a) Apical meristem
(b) Collenchyma
(c) Cambium
(d) Xylem

Q45. Viacom 18 Media PVT. Ltd. Launched its Hindi movie channel Rishtey Cineplex in _____.

(a) March 2017
(b) May 2016
(c) October 2015
(d) April 2014

Q46. If α and β are the roots of the quadratic equation $(5 + \sqrt{2})\ x^2 - (4 + \sqrt{5})\ x + (8 + 2\sqrt{5}) = 0$, then the value of $2\alpha\beta/ (\alpha + \beta)$ is:

(a) 7
(b) 4
(c) 2
(d) 8

Q47. What was the real name of the Indian director 'Guru Dutt'?

(a) Vasant Padukone
(b) Vasant Kumar Shivashankar Padukone
(c) Prabhakar Padukone
(d) Shambhunath Padukone

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Q48. Consider the following statement and conclusions and decide which of the conclusions logically follows from the statement.

Statement:

Of all the mobile brands, Samsung's sales are the highest.

Conclusions:

I. The market share of other mobile brands is known.

II. No other mobile brand is popular.

(a) Both the conclusions follow
(b) Conclusion II alone follows
(c) Neither conclusion I nor II follows
(d) Conclusion I alone follows

Q49. The melting point of tungsten is _____.

(a) 3,830 °C
(b) 3,308 °C
(c) 3,083 °C
(d) 3380 °C

Q50. A free fall in true sense occurs only _____.

(a) In the sea
(b) In the atmosphere
(c) In air
(d) In vacuum

Q51. Which of the following is NOT required for photosynthesis?

(a) Sunlight
(b) Oxygen
(c) Carbon dioxide
(d) Chlorophyll

Q52. Without any stoppage, Sunil travels a certain distance at an average speed of 80 km/hr. With stoppages, he covers the same distance at an average speed of 60 km/hr. How many minutes per hour does he stop for?

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

Q53. If a workforce of 200 men can construct a building in 1024 days, how many men will be needed to construct the same building in 256 days?

(a) 1400
(b) 650
(c) 1200
(d) 800

Q54. Find the next term in the following series.

T, A, S, B, R, C, ?

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

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Q55. Who among the following was honored with the Cecil B. Demille Award at the 75^(th) Golden Globe Awards?

(a) Oprah Winfrey
(b) Audrey Hepburn
(c) Goldie Hawn
(d) Mother Teresa

Q56. A tube can fill a tank in 15 hours. Due to a leak in the bottom, it is filled in 20 hours. If the tank is full, how much time will the leak alone take to empty it?

(a) 20 hours
(b) 60 hours
(c) 32 hours
(d) 40 hours

Q57. If 10 sin^4α + 15 cos^4α = 6, then find the value of 27 cosec^6α + 8 sec^6α.

(a) 75
(b) 125
(c) 250
(d) 50

Q58. If the number x4738 is divisible by 9, what is the face value of x?

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

Q59. Find the odd one out.

A. Flower
B. Weed
C. Leaves
D. Stem

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

Q60. India is the largest producer, consumer, importer of _____.

(a) Pulses
(b) Jute
(c) Sugar
(d) Salt

Q61. What is the lateral mirror image of the word 'KIT'?

KIT	TIK	⊥IK	⊥IK
A	B	C	D

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

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Q62. What will come in the place of the question mark '?' in the following question?

66 ÷ [67 - {43 - (17 - 117 ÷ 9 × 4)}] = ?

(a) -6
(b) 11
(c) 6
(d) -11

Q63. Which of the following element could NOT find a fixed place in Mendeleev's periodic table?

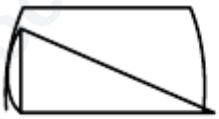
(a) Sulphur
(b) Hydrogen
(c) Nitrogen
(d) Oxygen

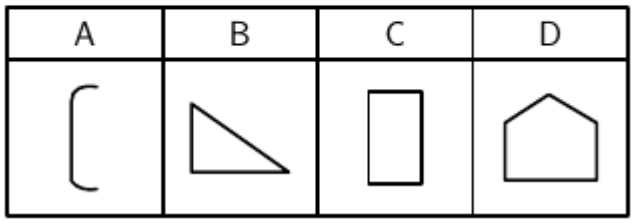
Q64. Find the next term in the following series.

3B, 9F, 27J, ?

(a) 80 L
(b) 81 L
(c) 81 N
(d) 80 N

Q65. Which of the following shapes can be found in the question figure?





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

Q66. To which country does the personality Aung-san Sukyi belong? She is often seen in the news.

(a) Iran
(b) Bhutan
(c) Myanmar
(d) Bangladesh

Q67. The headquarters of the World Bank is located in which country?

(a) England
(b) USA
(c) Japan
(d) Russia

Q68. Which of the following arguments is strong with relation to the given question?

Statement:
Should the government ban use of polythene bags in local vegetable markets?
Arguments:
I. Yes, they pose a high risk to the environment. People can bring along their own bags to buy vegetables.

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II. No, it is convenient

(a) Neither argument I and II are strong
(b) Both arguments I and II are strong
(c) Only arguments II is strong
(d) Only argument I is strong

Q69. If the arithmetic mean of the observations x1, x2, x3, ... x_n is 1 then the arithmetic mean of x1/k,x2/k,x3/k, … x_n/k(k > 0) is:

(a) k
(b) 2k
(c) 1/k
(d) 2/k

Q70. Mechanical energy is _____.

(a) Equal to the rate of doing work
(b) The sum of kinetic energy and the potential energy of an object
(c) The energy released during mechanical work
(d) The energy absorbed during movement of a body

Q71. C is the mother of E and F. F is married to Z. How is C related to Z?

(a) Mother
(b) Mother-in-law
(c) Daughter-in-law
(d) Son-in-law

Q72. A 1-kg object falls from a height of 30 m to the ground. The work done by the force of gravity will be _____. (Take g = 10 m/s²)

(a) 10 J
(b) 300 J
(c) 30 J
(d) 0.33 J

Q73. If 'MAT' is coded as KYR in a certain language, how would 'HIS' be written in that language?

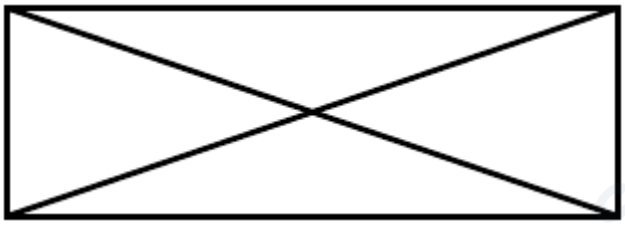
(a) FGT
(b) FGR
(c) FGQ
(d) FGH

Q74. Select the lateral mirror image of LIGHT from the given option figures.

LIGHT	THGIL	LIGHT	LIGHT
A	B	C	D

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

Q75. How many triangles are there in the given figure?



(a) 7
(b) 6
(c) 8
(d) 4

Q76. Newlands's law of octaves was applicable only up to _____.

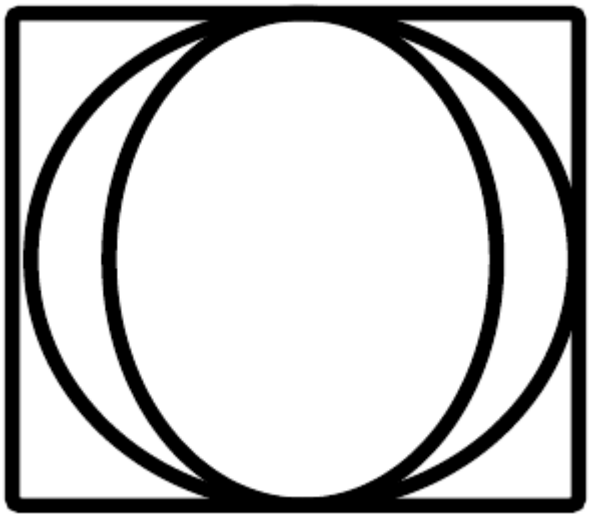
(a) Potassium
(b) Calcium
(c) Chlorine
(d) More than one of the above
(e) None of the above

Q77. Which of the following is the youngest mountain of India?

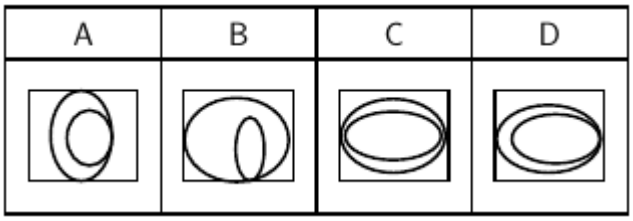
(a) Himalayas
(b) Mount Abu
(c) Satpura
(d) Anaimudi

Q78. Which pattern closely resembles the pattern in the following image?

Question figure



Option figure



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

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(d) C

Q79. When two germ cells from two individuals combine during sexual reproduction, they form a _____.

(a) Bud
(b) Spore
(c) Zygote
(d) Fruit

Q80. Two men Kuldeep and Agarkar working separately can mow a field in 8 and 12 hours respectively. If they both are working alternately for an hour, and Kuldeep starts the work at 9 a.m., when will the mowing be finished?

(a) 7.30 p.m.
(b) 5.30 p.m.
(c) 6.30 p.m.
(d) 4.30 p.m.

Q81. Which of the following metals is a liquid at room temperature?

(a) Tungsten
(b) Bromine
(c) Lead
(d) Mercury

Q82. Who is the present CEO of ICICI Bank?

(a) Arundhati Bhattacharya
(b) Indra Nooyi
(c) Sandeep Bakhshi
(d) K. V. Kamat

Q83. Lalitha plans to start a fashion boutique and she sets aside Rs. 20,000 as starting capital. Based on the below table how much money would she be left with for the other expenses she would come across?

Expenses	% of expenses
Unstitched materials	50
Stitching accessories	20

(a) Rs. 3000
(b) Rs. 12000
(c) Rs. 6000
(d) Rs. 4000

Q84. The Income Declaration Scheme was launched by the Income Tax Department of the Government of India in the year _____.

(a) 2015
(b) 2014
(c) 2016
(d) 2013

Q85. According to the Constitution of India, which House of Parliament passes the Constitution Amendment Bill?

(a) Both, Upper and Lower House together
(b) Lower House
(c) Upper House
(d) Both, Upper and Lower House separately

Q86. What is the square root of 108900?

(a) 230
(b) 330
(c) 270

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(d) 370

Q87. A company plans to arrange for an event. It divides its event's total expected expenditure into five broad segments. Here is the distribution:

Expense segments	% of employees
1	30
2	20
3	10
4	20
5	20

If the company spends Rs. 5000 on segment 3, what will be its expense on segment 5?

(a) Rs. 5,000
(b) Rs. 1,000
(c) Rs. 10,000
(d) Rs. 15,000

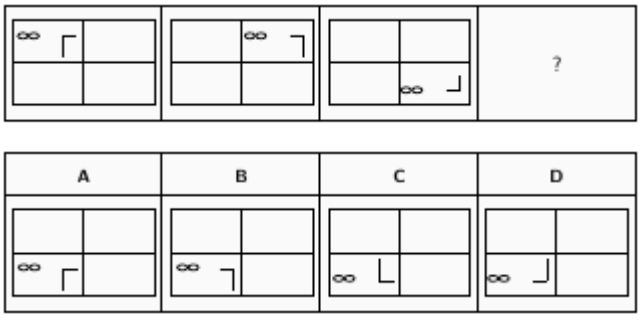
Q88. Which gas is produced when a metal reacts with water?

(a) Oxygen
(b) Chlorine
(c) Hydrogen
(d) Nitrogen

Q89. $x = (\sqrt{(6 - 1)})/(\sqrt{(6 + 1)})$ and $y = (\sqrt{(6 - 1)})/(\sqrt{(6 + 1)})$; Find $((3x^2 + 5xy + 3y^2))/((3x^2 - 5xy + 3y^2))$

(a) 6
(b) 5
(c) 9
(d) 11

Q90. Study the patterns in the below answer figures and decide which figure follows next.



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

Q91. An object starts its motion from rest. It gains a speed of 5 m/s in 2s. Its acceleration will be _____.

(a) 2.5 m/s²
(b) 1 m/s²
(c) 2 m/s²
(d) 0.4 m/s²

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Q92. Which of the following assumptions is/are implied from the below statement?

Statement:

"I am eagerly awaiting to present this year's report to the top management", said the area sales manager to his colleague.

Assumptions:

I. The company has some new acquisitions in that area.

II. The manager has vital information that would make an impression on the top management.

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

Q93. A basic event in protein synthesis is the creation of a/an ____.

(a) DNA copy
(b) RNA copy
(c) mRNA copy
(d) DNA and RNA copy

Q94. Name the Indian woman cricketer who became the highest wicket-taker in Women's ODI as of 27^(th) June 2017?

(a) Jhulan Goswami
(b) Devika Vaidya
(c) Mansi Joshi
(d) Soni Yadav

Q95. Find the odd one out.

A	B	C	D
S18	U20	Y25	W22

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

Q96. Tarun, Manav, Nitu, Hema, and Priya are standing in a row according to their height. Which of the following statements is sufficient to answer the following question?

Who among the five is standing in the middle?

Statements:

1. Nitu is the tallest
2. Tarun is taller than Manav
3. Hema is the shortest of them all
4. Manav is taller than Priya

(a) Statements 1, 2, 3 and 4 together are sufficient
(b) Statement 1 and 3 are sufficient
(c) Statement 1, 2 and 3 alone are sufficient
(d) None of the statements are sufficient

Q97. With a view to assisting outstanding sportspersons of yester years, living in indigent circumstances who has won glory for the country in sports _____ was set up in 1982.

(a) National Welfare Club for Sportsperson
(b) National Promotion Scheme for Sportsperson
(c) National Welfare Fund for Sportsperson
(d) National Pension Scheme for Sportsperson

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Q98. The ratio of the interior and the exterior of angles of a regular polygon is 4 : 1. What is the number of sides of the polygon?

(a) 8
(b) 12
(c) 6
(d) 10

Q99. Consider the given statement and decide which of the following assumptions is/are implicit in the statement.

Statement:

Laugher therapy is the best alternative therapy.

Assumptions:

I. Laughter is simple and universal.

II. Laughter generates happy hormones in our system that boosts immune system.

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

Q100. Kazipet, which has a population of 4000, requires 9 litres of water per person per day. It has a cuboidal tank measuring 15 m × 8 m × 6 m. If the tank is full of water then for how many days will the water of this tank last?

(a) 25 days
(b) 30 days
(c) 10 days
(d) 20 days

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (b) 20

The logic follows here:

A sector of a circle is called the minor sector if the minor arc of the circle is a part of its boundary. It is the sector with a smaller area. The angle of a minor sector is less than 180 degrees.

In the given diagram,

5 circle is given and each circle divides into 4 sectors.

So, 5 × 4 = 20.

Hence, the "20" sectors are there in the following figure.

Q2. Answer: (d) Indian National Congress

• Indian National Congress won the highest number of seats in the Manipur Legislative Assembly Elections held in 2017.

• Indian National Congress won 28 seats and Bharatiya Janata Party won 21 seats.

• Chief Minister of Manipur is N. Biren Singh and he belongs to Bharatiya Janata Party.

Q3. Answer: (a) Ring

On the wrist we wear watches thus following the same pattern on the finger we wear a ring.

Hence, “ring” is the correct answer.

Q4. Answer: (c) 63

The pattern followed here is as follows,

Hence, “63” is the correct answer.

Q5. Answer: (c) 352 cm²

Shortcut Trick

Identify Radius (r) using Pythagoras triplet: $r^2 = l^2 - h^2$.

$r^2 = 16^2 - (3\sqrt{23})^2 = 256 - 207 = 49 \Rightarrow r = 7$ cm.

Curved Surface Area (CSA) = $\pi rl = (22/7) \times 7 \times 16 = 22 \times 16$.

CSA = 352 cm².

Therefore The correct answer is 352 cm².

Alternate Method

Given:

Height (h) = $3\sqrt{23}$ cm

Slant height (l) = 16 cm

Formula Used:

Radius (r) = $\sqrt{(l^2 - h^2)}$

Curved Surface Area = πrl

Calculations:

$\Rightarrow r^2 = l^2 - h^2$

$\Rightarrow r^2 = 16^2 - (3\sqrt{23})^2$

$\Rightarrow r^2 = 256 - (9 \times 23)$

$\Rightarrow r^2 = 256 - 207 = 49$

$\Rightarrow r = \sqrt{49} = 7$ cm

$\Rightarrow$ CSA = $\pi \times r \times l$

$\Rightarrow$ CSA = $(22/7) \times 7 \times 16$

$\Rightarrow$ CSA = $22 \times 16 = 352$ cm²

Therefore The correct answer is 352 cm².

Additional Information

Total Surface Area (TSA) of Cone

The total surface area includes the curved area and the base area: TSA = $\pi r(l + r)$.

Volume of Cone

The space occupied by the cone is calculated as: Volume = $(1/3)\pi r^2 h$.

Relation between l, r, and h

In a right circular cone, the slant height (l), radius (r), and height (h) form a right-angled triangle: $l^2 = r^2 + h^2$.

Q6. Answer: (c) Rate of diffusion of gases depends on their volume

Explanation:

• The rate of diffusion of gases do not depend upon their volume.

• Diffusion is the process of particles moving from highly concentrated region to low concentrated region.

• Rate of diffusion of gases is higher when compared to liquids and solids as gases can move freely from one region to another.

• Diffusion is only possible if the matter moves continuously as diffusion meant that moving of particles from high concentration to low concentration region.

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Q7. Answer: (b) Corrosion

• Corrosion is a process in which a surface of metals such as Iron, copper etc. are corroded when they are exposed to moisture/ moist air or acids.

• Corrosion can be prevented by painting, oiling, greasing, Galvanizing, Chrome Plating or making alloys.

Process	Definition
Oxidation	It is a reaction in which either addition of Oxygen takes place or removal of Hydrogen takes place.
Reduction	It is a reaction in which either addition Hydrogen of takes place or removal of Oxygen takes place.
Rancidity	It is produced due to aerobic oxidation of fats present in food, oil etc. due to moisture or bacteria etc.

Q8. Answer: (a) G. Satheesh Reddy

• G. Satheesh Reddy was conferred with the National Design Award in December 2017.

• He is the chief of Defense Research and Development Organization as of 2019.

• He was awarded the Missile System Award 2019 by the American Institute of Aeronautics and Astronautics.

Q9. Answer: (a) Rate of doing work or rate of transfer of energy

• Power is defined as the rate of doing work or the rate of transfer of energy.

• It can also be said as the amount of work done in a given amount of time.

• SI unit of power is represented by Watt (W).

• Formulae for power is given by p = W /t.

• Where W is work done and t is time.

Q10. Answer: (c) 1919

The correct answer is 1919.

Key Points

• The Jallianwala Bagh massacre, also known as the Amritsar massacre, took place on April 13, 1919.

• On this day, around 50 troops of the British Indian Army, under the command of Colonel Reginald Dyer, fired on a crowd of Baishakhi pilgrims, who had gathered in Jallianwala Bagh, Amritsar, Punjab.

• After a public outcry, the British Government formed the Hunter Commission to probe into the Jallianwala Bagh Massacre.

• The Hunter Commission condemned the Massacre, but no action was recommended against General Dyer, who was responsible for the Massacre.

• Rabindranath Tagore returned his Knighthood in response to the massacre.

• Lord Chelmsford (1916-1921) was the Governor-General/Viceroy of India during the Jallianwala Bagh Massacre.

• Governor Michael O' Dyer was assassinated by Udham Singh in London in 1940 as revenge against the massacre.

Q11. Answer: (c) [figure]

As we know that “carrots” and “cabbages” are “vegetables” but there is no relation between “carrots” and “cabbages”. Thus the best possible venn diagram representing above relation is as follows.

Hence, “option 3” is the correct answer.

Q12. Answer: (b) Om Prakash Rawat

• Election Commissioner Om Prakash Rawat was appointed as the next chief election commissioner (CEC) of India. Mr Rawat is the 22nd CEC of India. He succeeded Achal Kumar Joti. The government also appointed former finance secretary Ashok Lawasa as an Election Commissioner.

Q13. Answer: (a) Both Statements 1 and 2 alone are sufficient

Shortcut Trick

In Statement A: (1/3) × Weight = 2 kg => Weight of 1 box = 6 kg. Total weight = 6 × 6 = 36 kg.

In Statement B: Weight of (4 boxes − 2 boxes) = 12 kg => Weight of 2 boxes = 12 kg => Weight of 1 box = 6 kg.

Since both statements independently provide the weight of a single box, they are both sufficient.

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

Alternate Method

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Given: Total boxes = 6, all having equal weight. Let the weight of each box be w kg.

Formula Used: Total Weight = Number of boxes × Weight of one box

From Statement A:

=> (1/3) × w = 2 kg

=> w = 2 × 3 = 6 kg

=> Total Weight (6 boxes) = 6 × 6 = 36 kg (Statement A is sufficient)

From Statement B:

=> 4w = 2w + 12 kg

=> 4w − 2w = 12 kg

=> 2w = 12 kg

=> w = 6 kg

=> Total Weight (6 boxes) = 6 × 6 = 36 kg (Statement B is sufficient)

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

Additional Information

Data Sufficiency Rules

A statement is sufficient if it leads to a unique numerical value or a definite 'Yes/No' answer for the question asked.

Linear Equations in One Variable

Equations in the form ax + b = c allow for finding the value of an unknown variable (x) using simple transposition.

Unit Consistency

Always ensure that the units (e.g., kg, grams) are consistent across the mathematical expressions to avoid calculation errors.

Q14. Answer: (b) BC/4

Shortcut Trick

In ΔABC, F and E are mid-points, so FE = BC/2 and FE || BC.

Quadrilateral FBDE is a parallelogram, so its diagonals BE and DF bisect at X, making X the mid-point of DF.

Quadrilateral DCEF is a parallelogram, so its diagonals DE and CF bisect at Y, making Y the mid-point of DE.

In ΔDEF, X and Y are mid-points of sides DF and DE respectively.

By Midpoint Theorem in ΔDEF, XY = FE/2 = (BC/2) / 2 = BC/4.

Therefore The correct answer is BC/4.

Alternate Method

Given: D, E, and F are mid-points of sides BC, CA, and AB of ΔABC.

Formula Used: Midpoint Theorem states that the segment joining the midpoints of two sides of a triangle is parallel to the third side and half its length.

A

B

C

D

Q15. Answer: (d) 6.022×10^{23}

- The number of moles present in one mole of copper 6.022×10^{23} mol.
- Every compound contains same molecules in one mole.
- Mole can be defined as the amount of substance that contains as many particles as there in the 12 gm of 12C Carbon isotope.
- It is also known as Avogadro Constant and denoted by NA.
- SI unit of Mole is mol.

Q16. Answer: (d) 7

Using BODMAS rule,

=> 119 ÷ [22 - {90 ÷ (23 - 105 ÷ (7 × 3))}]

=> 119 ÷ [22 - {90 ÷ (23 - 105 ÷ 21)}]

=> 119 ÷ [22 - {90 ÷ (23 - 5)]

=> 119 ÷ [22 - {90 ÷ 18}]

=> 119 ÷ [22 - 5]

=> 119 ÷ 17 = 7

Q17. Answer: (a) Democritus

• The word ‘atom’ is coined by Democritus.
• He suggested that if we go on dividing matter at a certain point the atom becomes indivisible or cannot be divided further.
• He called these particles as atoms (Indivisible).

Scientist	Discovered
Thomson	Electron
E Rutherford	Discovered alpha and beta particles
John Dalton	Father of Atomic Theory

Q18. Answer: (c) East

As we know in the morning, sun will be in east thus the opposite direction to the east is west.
Following figure shows the travelling path of Nina.
Clearly Nina turned towards the east direction at last.
Hence, “east” is the correct answer.

Q19. Answer: (a) Olfactory indicators

• The substances whose odour changes in acidic or basic media are called Olfactory Indicators.
• Onion, Clove, Vanilla etc. are some examples of Olfactory Indicators.
• These are the type of indicators are found naturally and used to test whether a given solution is an acid or a base.
• Some common examples are turmeric, grape juice etc.
• Synthetic indicators are different from natural indicators as the test for acids and bases is done with synthetic materials such as methyl orange and phenolphthalein.
• Any substance that indicates the presence of Acid or Base usually by changing colour is called Acid-Base indicators.
• Some common examples are red cabbage leaves, Turmeric etc.

Q20. Answer: (b) Only conclusion 1 follows

The minimum possible Venn diagram of the given statements,
Conclusions:
1. All rocks are ores → True
2. All minerals are rocks → False (it is possible but not definite)
Hence, only conclusion 1 follows.

Q21. Answer: (b) 100 kg.ms^(-1)

• Momentum is defined as the product of mass and velocity.
• Mass of the gun = 400 kg
• Its recoil velocity is 0.25 ms^(-1)
• We know that formula momentum (p) = mv
• Now by substituting the above values we get (p) = 400 × 0.25
= 100 kg.m/s.
• The momentum of a gun is 100 kg.ms^(-1).

Q22. Answer: (d) 21/5

Shortcut Trick
Ratio of Sooraj and Arjun currently = 3 : 1
Ratio after 8 years = 2.5 : 1 => 5 : 2
Difference in Arjun's age parts (2 − 1) = 1 unit → 8 years (Since base diff is same)
After another 8 years (total 16 years), add 1 more unit to each: Sooraj = 5 + 1 = 6, Arjun = 2 + 1 = 3 (Wait, check scaling: 3:1 vs 5:2 diff is 2 vs 3, make diff same × 3 and × 2)
Correct parts: Current (9 : 3), After 8 yrs (10 : 4). Gap 1 unit = 8 yrs. After 16 yrs: (11 : 5) => 11/5 = 2.2 times.
Therefore The correct answer is 2(1/5) times.
Alternate Method
Given: Present age of Sooraj = 3 × Arjun. After 8 years, Sooraj = 2.5 × Arjun.

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=> Let Arjun's current age be x, then Sooraj's age is 3x.

=> (3x + 8) = 2.5 × (x + 8)

=> 3x + 8 = 2.5x + 20

=> 0.5x = 12 => x = 24

=> Present ages: Arjun = 24 years, Sooraj = 72 years.

=> After another 8 years (Total 16 years from now):

=> Arjun = 24 + 16 = 40 years

=> Sooraj = 72 + 16 = 88 years

=> Ratio = 88 ÷ 40 = 2.2 = 2(1/5)

Therefore The correct answer is 2(1/5) times.

Additional Information

Age Difference Property

The absolute difference between the ages of two people remains constant throughout their lives, regardless of the number of years passed.

Ratio Balancing Method

If the ratio of ages at two different times is given, multiply the ratios such that the difference between the parts of the ratio remains the same for both people.

Fraction to Ratio Conversion

A value of 2.5 times is equivalent to a ratio of 5:2, and 2.2 times is equivalent to 11:5 or 2(1/5).

Q23. Answer: (c) FRLQV

The pattern followed here is as follows,

Similarly,

Hence, “FRLQV” is the correct answer.

Q24. Answer: (a) 10

Using BODMAS rule,

=> -15 - (-18 - 35 ÷ 5)

=> -15 - (-18 - 7)

=> -15 - (-25)

=> -15 + 25 = 10

Q25. Answer: (a) Alloys

• Alloys do not oxidize readily at high temperatures.

• Alloy is a homogenous mixture of two or more metals; or a metal and a non-metal.

• It prepared by melting a primary metal and dissolving other elements in definite proportions and cooled at room temperature.

• Alloys are usually prepared to get desired properties such as high melting point, protection against corrosion etc.

• Hence alloys do not oxidize as alloying improve properties of pure metals as alloying of iron mixed with nickel and chromium, it will become resistance to oxidization.

• But there are some alloys are prepared to get low melting points like solder which is made up of lead and tin.

Q26. Answer: (b) 462

Shortcut Trick

Identify the highest power of prime factors present in the numbers.

Factors: 14 = 2 × 7 | 42 = 2 × 3 × 7 | 77 = 7 × 11

LCM = $2^1 \times 3^1 \times 7^1 \times 11^1$ = 6 × 77 = 462.

Therefore The correct answer is 462.

Alternate Method

Given: Numbers are 14, 42, and 77.

Formula Used: Prime Factorization Method for Least Common Multiple (LCM).

Calculations:

=> Prime factorization of 14 = 2 × 7

=> Prime factorization of 42 = 2 × 3 × 7

=> Prime factorization of 77 = 7 × 11

=> To find the LCM, take the highest power of each prime factor involved:

=> LCM = 2 × 3 × 7 × 11

=> LCM = 6 × 77

=> LCM = 462

Therefore The correct answer is 462.

Additional Information

Relationship between LCM and HCF

For any two positive integers a and b, LCM(a, b) × HCF(a, b) = a × b.

Division Method for LCM

Write the numbers in a row and divide by the smallest prime number that divides at least two of the numbers; continue until no two numbers have a common factor.

LCM of Fractions

The LCM of fractions = (LCM of Numerators) ÷ (HCF of Denominators).

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

The minimum possible Venn diagram of the given statements,

Conclusions:

1. Some Lemons are Jump → False (“Jump” is not mentioned in the statement, so we can't say about the relation between “lemon” and “jump”)

2. Beet is a Red → False (There is no direct relation given between beet and red so it is possible but not definite)

Hence, neither conclusion 1 nor conclusion 2 follows.

Q28. Answer: (d) 1983

• The South Asian Sports Council (SASC) was formed in the year 1983.

• South Asia Games are governed by SASC.

• The first South Asia games hosted by Kathmandu, Nepal in 1984.

• South Asian games are held once in every two years.

Q29. Answer: (c) D

The pattern followed here is, every symbol in the next image is shifted to its next position and 4^(th) position symbol is replacing 1^(st) position symbol as follow,

Similarly,

Hence, “D” is the correct answer.

Q30. Answer: (a) Rs. 8,000

Shortcut Trick

Let the total monthly salary be 100%.

Expenditure = 85% → Savings = 100% − 85% = 15%.

Given 15% = Rs. 1200.

100% = (1200 ÷ 15) × 100 = 80 × 100 = Rs. 8,000.

Therefore The correct answer is Rs. 8,000.

Alternate Method

Given:

Percentage spent by Alok = 85%

Monthly savings = Rs. 1200

Formula Used:

Total Salary = Expenditure + Savings

Calculations:

=> Let total monthly salary be x.

=> Savings percentage = 100% − 85% = 15%

=> 15% of x = 1200

=> (15 ÷ 100) × x = 1200

=> x = (1200 × 100) ÷ 15

=> x = 80 × 100

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=> x = 8000

Therefore The correct answer is Rs. 8,000.

Additional Information

Percentage Change

To find the original value when a percentage decrease is known: Original = Final ÷ (1 − r/100).

Base Value Concept

In salary-based problems, the total income is always treated as the 100% base for all calculations.

Fractional Equivalent

15% can be written as 3/20. If 3 units = 1200, then 1 unit = 400 and 20 units (total) = 8000.

Q31. Answer: (a) Lord Canning

Correct Answer Lord Canning

Key Points:

• Lord Canning (1856-1862) was the first viceroy of India.

• Viceroy is the British crown representative of the princely states of India.

• Lord Canning became first the Viceroy and governor-general of India through the government of India Act 1858.

• He was the Governor-General of India during the Indian Sepoy Mutiny in 1857.

Q32. Answer: (d) Rs. 88.70

Shortcut Trick

For a period of 3 years, the difference between CI and SI is given by the formula: $D = P(R/100)^2 \times (3 + R/100)$.

Substituting the values: Principal (P) = Rs. 4500, Rate (R) = 8%.

Difference = $4500 \times (8/100)^2 \times (3 + 8/100)$ => $4500 \times 0.0064 \times 3.08$.

Difference = $28.8 \times 3.08 = 88.704$.

Therefore The correct answer is Rs. 88.70.

Alternate Method

Given: Principal (P) = Rs. 4500, Time (T) = 3 years, Rate (R) = 8% per annum.

Formula Used: SI = (P × R × T) / 100 | CI = $P[(1 + R/100)^n - 1]$

=> Simple Interest (SI) = (4500 × 8 × 3) ÷ 100

=> SI = 45 × 24 = Rs. 1080

=> Compound Interest (CI) = $4500 \times [(1 + 8/100)^3 - 1]$

=> CI = $4500 \times [(1.08)^3 - 1]$

=> CI = $4500 \times [1.259712 - 1] = 4500 \times 0.259712$

=> CI = Rs. 1168.704

=> Difference = CI − SI = 1168.704 − 1080 = Rs. 88.704

Therefore The correct answer is Rs. 88.70.

Additional Information

Difference for 2 years

The difference between CI and SI for 2 years is calculated as: $D = P(R/100)^2$.

Effective Rate of Interest

For 3 years at 8%, the effective CI rate is $(1.08^3 - 1) \times 100 = 25.9712\%$, while the SI rate is 8 × 3 = 24%.

Successive Percentage Change

CI can be viewed as successive percentage increases: $R_{(net)} = x + y + (xy/100)$.

Q33. Answer: (b) Scalene triangle

Shortcut Trick

Calculate the squared lengths of the sides to identify the triangle type quickly.

Side $1^2 = (4-1)^2 + (1-1)^2 = 3^2 + 0^2 = 9$

Side $2^2 = (3-1)^2 + (5-1)^2 = 2^2 + 4^2 = 20$

Side $3^2 = (3-4)^2 + (5-1)^2 = (-1)^2 + 4^2 = 17$

Since all squared lengths are different ($9 \neq 20 \neq 17$), all sides are unequal.

Also, no two squared lengths sum to the third (9 + 17 ≠ 20), so it is not right-angled.

Therefore The correct answer is Scalene triangle.

Alternate Method

Given: Vertices of the triangle are A(4, 1), B(1, 1), and C(3, 5).

Formula Used: Distance between two points (x1, y1) and (x2, y2) = $\sqrt{((x2-x1)^2 + (y2-y1)^2)}$

=> Length of side AB = $\sqrt{((4-1)^2 + (1-1)^2)} = \sqrt{(3^2 + 0^2)} = 3$ units

=> Length of side BC = $\sqrt{((3-1)^2 + (5-1)^2)} = \sqrt{(2^2 + 4^2)} = \sqrt{20}$ units

=> Length of side AC = $\sqrt{((3-4)^2 + (5-1)^2)} = \sqrt{((-1)^2 + 4^2)} = \sqrt{17}$ units

=> Comparing the sides: $3 \neq \sqrt{20} \neq \sqrt{17}$. Since all sides are unequal, it is a Scalene triangle.

=> Checking Pythagoras Theorem: $3^2 + (\sqrt{17})^2 = 9 + 17 = 26$. Since $26 \neq (\sqrt{20})^2$, it is not a right-angled triangle.

Therefore The correct answer is Scalene triangle.

Additional Information

Scalene Triangle

A triangle in which all three sides have different lengths and all three angles have different measures.

Isosceles Triangle

A triangle that has two sides of equal length and two equal angles opposite those sides.

Right-Angled Triangle

A triangle with one angle exactly 90°. It must satisfy the condition $a^2 + b^2 = c^2$, where c is the longest side.

Distance Formula

The distance between two points in a 2D plane is given by $d = \sqrt{((x2-x1)^2 + (y2-y1)^2)}$.

Q34. Answer: (a) Tuesday

Given that it was a Thursday on 7th June 1984.

From 7th June 1983 to 7th June 1984, the number of odd days = 2 as 1984 is a leap year.

Hence, the day on 7th June 1983 was Tuesday.

Q35. Answer: (c) 2010

- Apple introduced the iPad as a multimedia device in the year 2010.
- Apple is introduced iWatch in the year 2015 and iPhone in 2007.
- It is the first company in the world to reach the market valuation of 1 Trillion Dollars.
- CEO of the company is Tim Cook.

Q36. Answer: (a) Work

CONCEPT:

- Work is said to be done by a force when the body is displaced actually through some distance in the direction of the applied force.
- Since the body is being displaced in the direction of F, therefore work done by the force in displacing the body through a distance s is given by:

$W = \vec{F} \cdot \vec{s}$

Or, $W = Fs \cos \theta$

- Thus work done by a force is equal to the scalar or dot product of the force and the displacement of the body.

EXPLANATION:

- The product of Force and Displacement is called Work. So option 1 is correct.

Quantity	Definition
Weight (W)	It is the product of mass and acceleration due to gravity
Acceleration (a)	Acceleration is defined as the rate of change of velocity
Momentum (p)	Momentum is defined as the product of mass and velocity

Q37. Answer: (d) Protozoa

- The Protozoa is not a part of the 5-Kingdom classification by Whittaker.
- R.H. Whittaker proposed a Five Kingdom Classification in the year 1969.
- The 5 Kingdoms he classified are Monera, Protista, Fungi, Plantae and Animalia.
- He defined these five kingdoms based on cell structure, thallus organization, mode of nutrition, reproduction and phylogenetic relationships.

Q38. Answer: (b) -0.1

Symbols	•	×
Meaning	•	÷

Given expression: ((25 + 30) × 5) × 10)

After changing the symbols:

((25 - 30) ÷ 5) ÷ 10)

= ((-5) ÷ 5) ÷ 10

= -1 ÷ 10 = -0.1

Hence, “-0.1” is the correct answer.

Q39. Answer: (c) 22/32

Shortcut Trick

To find the missing fraction that completes a whole (1), subtract the given fraction from 1.

Required Fraction = 1 − 5/16 = 11/16

Check options for equivalent fractions: 11/16 × 2/2 = 22/32

Therefore The correct answer is 22/32.

Alternate Method

Given:

Initial fraction = 5/16

Target sum = 1

Formula:

Missing Fraction = Target Sum − Given Fraction

Calculations:

=> Let the required fraction be x.

=> 5/16 + x = 1

=> x = 1 − 5/16

=> x = (16 − 5) / 16

=> x = 11/16

=> To match the denominators in the options, multiply the numerator and denominator by 2:

=> x = (11 × 2) / (16 × 2)

=> x = 22/32

Therefore The correct answer is 22/32.

Additional Information

Equivalent Fractions

Fractions that represent the same value by multiplying or dividing the numerator and denominator by the same non-zero number (e.g., 11/16 = 22/32).

Proper Fractions

A fraction where the numerator is less than the denominator (e.g., 5/16 is a proper fraction as 5 < 16).

Reciprocal of a Fraction

The reciprocal of a fraction a/b is b/a. The product of a fraction and its reciprocal is always 1.

Q40. Answer: (c) 9 January 2018

- The first ‘Persons of Indian Origin (PIO) Parliamentarian Conference’ was held on 9 January 2018.
- It was the first PIO-Parliamentarian Conference and it was held in New Delhi.

Q41. Answer: (c) 25% gain

Shortcut Trick

Let Marked Price (MP) be 100.

Cost Price (CP) = 100 − 20% of 100 = 80.

Selling Price (SP) = Marked Price = 100.

Profit = 100 − 80 = 20.

Profit% = (Profit ÷ CP) × 100 = (20 ÷ 80) × 100 = 25%.

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Therefore The correct answer is 25% gain.

Alternate Method

Given → Discount = 20% on MP, Selling Price (SP) = Marked Price (MP).

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

=> Assume Marked Price = x.

=> Cost Price (CP) = x − 20% of x = 0.8x.

=> Selling Price (SP) = x (Given).

=> Profit = SP − CP = x − 0.8x = 0.2x.

=> Gain% = (0.2x ÷ 0.8x) × 100 = (1 ÷ 4) × 100 = 25%.

Therefore The correct answer is 25% gain.

Additional Information

Marked Price and Discount

Discount is always calculated on the Marked Price (MP). Formula: SP = MP × (100 − Discount%) ÷ 100.

Gain Percentage

Gain or Loss is always calculated on the Cost Price (CP) unless stated otherwise. Formula: Gain% = (Profit ÷ CP) × 100.

Q42. Answer: (a) Real and inverted

• An object is placed in front of a concave mirror at a point between its focus and centre of curvature. The image formed will be Real, Inverted and enlarged.

• The position of the image will be beyond the centre.

Type of Mirror	Position of the Object (O)	Position of the Image (I)	Nature of the Image Formed
Concave	At infinity	At Focus	Real, Inverted and diminished
Beyond Centre	Between Focus and Centre	Real, Inverted and diminished	
At Centre	At Centre	Real, Inverted and same size	
Between Centre and Focus	Beyond Centre	Real, Inverted and enlarged	
At Focus	At Infinity	Real, Inverted and Highly enlarged	
Between Focus and pole	Behind the Mirror	Virtual, Erect and enlarged	
Convex	All positions	Behind the Mirror	Virtual, Erect and diminished

Q43. Answer: (d) 125 J

• Weight of the object (m) = 10 kg

• Speed of the object (v) = 5 m/s

• We know that kinetic energy formulae (K.E) = ½ mv^2.

• Now by substituting the values in the formula we get

K.E = ½ (10) $(5)^2$

= 125 J

• The kinetic energy of the object is 125 J.

Q44. Answer: (b) Collenchyma

The correct answer is Collenchyma

Key Points

• Simple permanent tissues in plants are made up of cells that are similar in structure and function and have lost the capacity to divide. These tissues are involved in various functions like photosynthesis, storage, and support.

• The three main types of simple permanent tissues are parenchyma, collenchyma, and sclerenchyma. Each type plays a different role in the plant structure and function.

Apical meristem: This is a type of meristematic tissue, not a simple permanent tissue.

• Meristematic tissues consist of undifferentiated cells that have the capacity to divide.

• Apical meristems are found at the tips of roots and shoots and are responsible for the lengthwise growth of the plants.

• Since these cells are capable of division and give rise to various tissues, the apical meristem does not qualify as a simple permanent tissue.

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Collenchyma: This is a type of simple permanent tissue.

• Collenchyma cells are characterized by their unevenly thickened cell walls, which provide flexibility and mechanical support to growing parts of the plant like stems and leaves.

• They are living cells and are typically found beneath the epidermis.

Xylem: Xylem is a complex permanent tissue, not a simple one, involved in the transport of water and nutrients from the roots to other parts of the plant. It consists of several different types of cells, making it a complex tissue rather than a simple one.

Cambium: Cambium is not a simple permanent tissue; it is a type of meristematic tissue known as lateral meristem. It is responsible for the diameter growth in plants through the process called secondary growth. Cambium cells divide to produce new xylem and phloem cells, contributing to the thickness of stems and roots.

Therefore,among the options provided Collenchyma is the correct answer.

Q45. Answer: (b) May 2016

• Viacom 18 Media PVT. Ltd. Launched its Hindi movie channel Rishtey Cineplex in May 2016.

• It is the company first foray in Hindi films.

• Viacom 18 operates channels like MTV, Colours etc.

Q46. Answer: (b) 4

Concept Used:

For quadratic equation, $ax^2 + bx + c = 0$,

$\alpha + \beta = -b/a$ and $\alpha\beta = c/a$

Calculation:

Given equation is $(5 + \sqrt{2})\, x2 - (4 + \sqrt{5})\, x + (8 + 2\sqrt{5}) = 0$

On comparing this equation by ax2 + bx + c = 0, we get

$a = (5 + \sqrt{2})$, $b = -(4 + \sqrt{5})$ and $c = (8 + 2\sqrt{5})$

Now, $\alpha\beta = (8 + 2\sqrt{5})/(5 + \sqrt{2})$ and $\alpha + \beta = (4 + \sqrt{5})/(5 + \sqrt{2})$

Now, We have to find the value of $2\alpha\beta/(\alpha + \beta)$

$\Rightarrow 2[(8 + 2\sqrt{5})/(5 + \sqrt{2})] / [(4 + \sqrt{5})/(5 + \sqrt{2})]$

$\Rightarrow 2\,[(8 + 2\sqrt{5})\,(4 - \sqrt{5})] / [(4 + \sqrt{5})/(4 - \sqrt{5})]$

$\Rightarrow 2(32 + 8\sqrt{5} - 8\sqrt{5} - 10)/11$

$\Rightarrow 44/11 = 4$

Therefore The required value of $2\alpha\beta/(\alpha + \beta)$ is 4.

Q47. Answer: (b) Vasant Kumar Shivashankar Padukone

• The real name of the Indian director ‘Guru Dutt’ is Vasant Kumar Shivashankar Padukone (1925-1964).

• He was most famous for these films pyaasa and Kaagaz Ke Pool.

• He has been included in CNN top 25 actors of all time in the year 2010.

Q48. Answer: (d) Conclusion I alone follows

From the statement the “Of all the mobile brands, Samsung’s sales are the highest”, we can understand that there is a comparison taking place between Samsung mobile phones and all other mobile phones. Since the statement is comparing thus, we can make the conclusion that “The market share of other mobile brands is known” but there is no mention about the popularity of any other brands, thus, we cannot say that “No other mobile brand is popular”. Hence, only conclusion I follow.

Q49. Answer: (d) 3380 °C

• The melting point of tungsten is 3,380 °C.

• It is represented by W and has an atomic number of 74.

• It belongs to transition elements.

• Due to its high melting point, tungsten is used as filament in an incandescent bulb.

Q50. Answer: (d) In vacuum

A free fall in true sense occurs only in a vacuum.

• A fall is considered as a free fall if only force acting on it was gravity.

• As the vacuum contains no matter, there is no opposite force against the free fall due to gravity.

• In air and atmosphere, there is aerodynamic drag and in the sea, there is a buoyancy force of water to oppose the movement due to gravity.

Q51. Answer: (b) Oxygen

• Oxygen is not required for photosynthesis.

• Oxygen is liberated during photosynthesis.

• Photosynthesis is the process through which green plants manufacture food by converting solar energy into chemical energy. In this process, water and carbon dioxide react in the presence of sunlight to give off oxygen and glucose molecules.

• Leaves of a plant contain green colour due to the presence of chloroplasts.

• Chloroplasts contain the green substance called chlorophyll.

• Chlorophyll absorbs sunlight for photosynthesis.

Q52. Answer: (a) 15 minutes

Shortcut Trick

Stoppage time per hour = (Difference in speeds ÷ Speed without stoppage) × 60 minutes

Difference in speed = 80 − 60 = 20 km/hr

Stoppage time = (20 ÷ 80) × 60

Stoppage time = 1/4 × 60 = 15 minutes

Therefore The correct answer is 15 min.

Alternate Method

Given:

Speed without stoppage (u) = 80 km/hr

Speed with stoppage (v) = 60 km/hr

Formula Used:

Time = Distance ÷ Speed

Stoppage time per hour = (u − v) ÷ u

Calculations:

=> In 1 hour, distance covered without stoppage = 80 km

=> In 1 hour, distance covered with stoppage = 60 km

=> Loss in distance due to stoppage = 80 − 60 = 20 km

=> Time taken to cover 20 km at original speed = 20 ÷ 80 hours

=> Stoppage time in minutes = (20 ÷ 80) × 60

=> Stoppage time = 1/4 × 60 = 15 minutes

Therefore The correct answer is 15 min.

Additional Information

Average Speed Concept

Average speed is defined as the total distance traveled divided by the total time taken, including stoppage time.

Relative Speed

When two objects move in the same direction, relative speed = S1 − S2. In opposite directions, relative speed = S1 + S2.

Unit Conversion

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

Q53. Answer: (d) 800

Shortcut Trick

Apply the inverse proportionality rule between men and days: M1 × D1 = M2 × D2.

Ratio of days is 1024 : 256 = 4 : 1.

Ratio of men required will be the inverse: 1 : 4.

Since 1 unit = 200 men, then 4 units = 200 × 4 = 800 men.

Therefore The correct answer is 800 men.

Alternate Method

Person	Days	Total Work	Efficiency
Initial Workforce	1024	200	
New Workforce	256	M2	

Given:

Initial Men (M1) = 200
Initial Days (D1) = 1024
Required Days (D2) = 256
Formula Used:
Total Work = Men × Days
M1 × D1 = M2 × D2
Calculations:
=> 200 × 1024 = M2 × 256
=> M2 = (200 × 1024) ÷ 256
=> M2 = 200 × 4
=> M2 = 800
Therefore The correct answer is 800 men.
Additional Information
Chain Rule Formula
The general formula for work is (M1 × D1 × H1) ÷ W1 = (M2 × D2 × H2) ÷ W2, where M is men, D is days, H is hours, and W is work.
Inverse Proportion
When the amount of work is constant, men and days are inversely proportional. Doubling the men halves the time required.
Work & Wages
Wages are usually distributed in the ratio of the work done or the ratio of efficiencies when the time period is same.

Q54. Answer: (a) Q

The pattern followed here is as follows,
Hence, “Q” is the correct answer.

Q55. Answer: (a) Oprah Winfrey

- Oprah Winfrey was honoured with the Cecil B. Demille Award at the 75^(th) Golden Globe Awards.
- It was an award given to a person for his ‘outstanding contributions to the world of entertainment’.
- It was presented by the Hollywood Foreign Press Association.
- This award in 2019 was given to Jeff Bridges.

Q56. Answer: (b) 60 hours

Shortcut Trick
Product of times ÷ Difference of times
Time taken by leak = (15 × 20) ÷ (20 − 15)
Time taken by leak = 300 ÷ 5 = 60 hours
Therefore The correct answer is 60 hr.
Alternate Method

Component	Time (hr)	Total Work (LCM)	Efficiency
Tube (A)	15	60	4
Tube + Leak (A + B)	20	3	

Efficiency of Tube (A) = 4 units/hr
Combined Efficiency of Tube and Leak (A + B) = 3 units/hr
=> Efficiency of Leak (B) = (A + B) − A = 3 − 4 = −1 unit/hr (Negative sign indicates emptying)
=> Time taken by Leak alone = Total Work ÷ Efficiency of Leak
=> Time = 60 ÷ 1 = 60 hours
Therefore The correct answer is 60 hr.
Additional Information
Pipes and Cisterns Logic
Inlet pipes have positive efficiency while outlet pipes or leaks have negative efficiency.
Net Work Formula

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

Q57. Answer: (c) 250

Shortcut Trick

Compare 10 sin^4α + 15 cos^4α = 6 with 1 by dividing both sides by 6.

(10/6) sin^4α + (15/6) cos^4α = 1 => (5/3) sin^4α + (5/2) cos^4α = 1.

Standard Identity: $\sin^2\alpha + \cos^2\alpha = 1$. This holds when $\sin^2\alpha = 3/5$ and $\cos^2\alpha = 2/5$.

Value = $27 (1/\sin^2\alpha)^3 + 8 (1/\cos^2\alpha)^3 = 27 (5/3)^3 + 8 (5/2)^3 = 27 \times (125/27) + 8 \times (125/8) = 125 + 125 = 250$.

Therefore The correct answer is 250.

Alternate Method

Given: 10 sin^4α + 15 cos^4α = 6

Formula Used: $\sin^2\alpha + \cos^2\alpha = 1$; $\sec^2\alpha = 1/\cos^2\alpha$; $\text{cosec}^2\alpha = 1/\sin^2\alpha$

=> 10 sin^4α + 15 $(1 - \sin^2\alpha)^2 = 6$

=> 10 sin^4α + 15 (1 + sin^4α − 2 $\sin^2\alpha$) = 6

=> 25 sin^4α − 30 $\sin^2\alpha$ + 9 = 0

=> $(5 \sin^2\alpha - 3)^2 = 0$ => $\sin^2\alpha = 3/5$

=> $\cos^2\alpha = 1 - 3/5 = 2/5$

=> $\text{cosec}^2\alpha = 5/3$ and $\sec^2\alpha = 5/2$

=> 27 cosec^6α + 8 sec^6α = $27 (5/3)^3 + 8 (5/2)^3$

=> $27 \times (125/27) + 8 \times (125/8) = 125 + 125 = 250$

Therefore The correct answer is 250.

Additional Information

Trigonometric Identities

Fundamental relations: $\sin^2\theta + \cos^2\theta = 1$, $1 + \tan^2\theta = \sec^2\theta$, and $1 + \cot^2\theta = \text{cosec}^2\theta$.

General Comparison Rule

If (a/c) sin^4α + (b/c) cos^4α = 1, and it mimics $(\sin^2\alpha/\sin^2\alpha) + (\cos^2\alpha/\cos^2\alpha) = 1$, then $\sin^2\alpha = c/a$ and $\cos^2\alpha = c/b$.

Q58. Answer: (c) 5

Shortcut Trick

For a number to be divisible by 9, the sum of its digits must be divisible by 9.

Sum of given digits = x + 4 + 7 + 3 + 8 = x + 22.

The nearest multiple of 9 greater than 22 is 27.

=> x + 22 = 27 => x = 5.

Therefore The correct answer is 5.

Alternate Method

Given: The number is x4738 and it is divisible by 9.

Property used: Divisibility rule of 9 states that the sum of all digits must be a multiple of 9.

=> Sum of digits = x + 4 + 7 + 3 + 8

=> Sum = x + 22

=> For (x + 22) to be divisible by 9, let (x + 22) = 9n (where n is an integer)

=> Since x is a single digit (0-9), the only possible value for n is 3.

=> x + 22 = 27

=> x = 27 − 22

=> x = 5

Therefore The correct answer is 5.

Additional Information

Divisibility Rule of 3

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

Face Value vs Place Value

The face value of a digit is the digit itself, while the place value depends on its position (e.g., in x4738, the place value of x is x × 10000).

Divisibility Rule of 11

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

Q59. Answer: (c) B

Here, except 'weed' all others are part of plants but 'weed' is a plant itself.

Hence, 'weed' is the correct answer.

Q60. Answer: (a) Pulses

- India is the largest producer, consumer, importer of Pulses.
- India mainly produces pulses like chickpea, black gram, green gram, and lentil etc.
- India is the largest producer of Jute.
- India is the second-largest producer of Sugar.
- Gujarat is the largest producer of salt in the country.

Q61. Answer: (a) B

lateral mirror image of the word 'KIT' is as follows,

Hence, "option figure B" is the correct answer.

Q62. Answer: (a) -6

Calculation:

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

66 ÷ [67 - {43 - (17 - 117 ÷ 9 × 4)}] = ?

=> 66 ÷ [67 - {43 - (17 - 13 × 4)}] = ?

=> 66 ÷ [67 - {43 - (17 - 52)}] = ?

=> 66 ÷ [67 - {43 - (-35)}] = ?

=> 66 ÷ [67 - {43 + 35}] = ?

=> 66 ÷ [67 - 78] = ?

=> 66 ÷ -11 = ?

=> -6 = ?

Therefore The value of ? is -6

Q63. Answer: (b) Hydrogen

- Hydrogen is the element that could not find a fixed place in Mendeleev's periodic table.
- Mendeleev periodic law states that 'the properties of elements are the periodic function of their atomic masses'.
- Hydrogen has 1 electron in its outermost orbit hence it should be placed in s- group (Alkali metals) or group 1.
- But it behaved like a halogen (group 17) which gains one electron to reach the electronic configuration of a helium atom which is a noble gas.
- Hence hydrogen did not find a fixed place in Mendeleev periodic law.

Q64. Answer: (c) 81 N

The pattern followed here is as follows,

Hence, "81N" is the correct answer.

Q65. Answer: (b) A and B

The following figure explains the hidden image,

Hence, "A and B" is the correct answer.

Q66. Answer: (c) Myanmar

- Aung-san Sukyi belongs to the country of Myanmar (Formerly Burma).
- She was awarded the Noble Peace prize in the year 1991.
- She is currently the State Counsellor of Myanmar since 2016.
- Capital of Myanmar is Naypyidaw and its currency is Burmese Kyat.

Q67. Answer: (b) USA

- The headquarters of the World Bank is in the United States of America (USA).
- Its headquarters is in Washington D.C. USA.

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• It has a total membership of 189 countries.

• Along with the International Monetary Fund (IMF), the World Bank was established in the year 1945.

• IMF also has its headquarters in Washington D.C.

Q68. Answer: (d) Only argument I is strong

Argument I give the solid reason that “they pose a high risk to the environment” and also provide with the solution that “People can bring along their own bags to buy vegetables”. While the argument II is ambiguous and doesn’t argues on any solid base. Hence, “Only argument I is strong”.

Q69. Answer: (c) 1/k

Shortcut Trick

Property of Arithmetic Mean: If every observation in a data set is multiplied or divided by a constant non-zero value, the mean of those observations is also multiplied or divided by that same constant.

Given Original Mean of x1, x2, ..., x_n = 1.

Operation: Each observation is divided by k (or multiplied by 1/k).

New Mean = Original Mean ÷ k = 1 ÷ k = 1/k.

Therefore The correct answer is 1/k.

Alternate Method

Given:

The Arithmetic Mean of x1, x2, x3, ... x_n is 1.

New series is obtained by dividing each term by k where k > 0.

Calculations:

=> Sum of observations ∑x_i = x1 + x2 + ... + x_n

=> Original Mean = (∑x_i) / n = 1

=> ∑x_i = n

=> New Mean = [(x1/k) + (x2/k) + ... + (x_n/k)] / n

=> New Mean = [(1/k) × (x1 + x2 + ... + x_n)] / n

=> New Mean = [(1/k) × ∑x_i] / n

=> New Mean = [(1/k) × n] / n

=> New Mean = 1/k

Therefore The correct answer is 1/k.

Additional Information

Change of Origin and Scale

The Arithmetic Mean is affected by both change of origin (adding/subtracting a constant) and change of scale (multiplying/dividing by a constant). If y_i = (x_i − a) / h, then Mean(y) = (Mean(x) − a) / h.

Sum of Deviations

The sum of deviations of a set of observations from their Arithmetic Mean is always zero, i.e., ∑(x_i − Mean) = 0.

Effect on Variance

Unlike the mean, Variance is independent of change of origin but affected by change of scale. If each term is divided by k, the new variance becomes (Original Variance) / k².

Q70. Answer: (b) The sum of kinetic energy and the potential energy of an object

• Mechanical energy is defined as the sum of kinetic energy and potential energy in an object that is utilized to do work.

• Mechanical energy is a combination of kinetic energy and potential energy.

• Mechanical energy is the form of energy that is related to the position and motion of an object.

• Kinetic energy: The energy possessed by an object has because of its motion.

K. E. = (½) mv²

• Potential energy: The energy stored in an object because of its specific state or position.

P.E. = mgh

Q71. Answer: (b) Mother-in-law

Symbol for family tree:

We can draw a family tree from the given information,

Hence, C is the “mother-in-law” of Z.

Q72. Answer: (b) 300 J

Concept:

• Work is done: The product of force and displacement is called work done

• Work was done against gravity: When an object is brought to some height going against gravity, work is said to be done against gravity.

• This work done is converted into potential energy.

• The potential energy is energy stored in a body when work is done against gravity. It is given as

$P = m \times g \times h$

• As for lifting or after lifting at height some work needs to be done, .for e.g A coolie lifting a weight in his weight, it is in the form of potential energy, so work done can also be written as,

$W = P = m \times g \times h$.

m is mass, g is the acceleration due to gravity, and h is the height obtained.

Calculations:

• The mass of the object (m) is 1 kg.

• The height of the object (h) is 30m

• The gravity of the earth (g) is 10 m/s^2

• Now Work done by the force of gravity = mgh

• Now substituting the above values, we get

= (1)(30)(10) = 300 J

• The work done by the force of gravity will be 300 J.

Q73. Answer: (c) FGQ

The pattern followed here is as follows,

Similarly,

Hence, “FGQ” is the correct answer.

Q74. Answer: (c) B

the lateral mirror image of ‘LIGHT’ is shown in the following figure,

Hence, “option figure B” is the correct answer.

Q75. Answer: (c) 8

We can count triangle as follows,

Hence, there are “8” triangles in the given figure.

Q76. Answer: (b) Calcium

• Newlands’s law of octaves was applicable only up to calcium.

• Newland table was drawn by John Newlands in 1866 according to his Law of Octaves.

• In his theory, he purposed that when elements are arranged according to their increasing atomic weights then every eight elements have similar properties as the first element.

• After calcium, this law ceased to be valid as after calcium every eight elements do not have the same property of a first element.

Q77. Answer: (a) Himalayas

Correct Answer Himalayas

Key Points:

• The Himalayas is the youngest mountain (Fold Mountain) in India.

• Due to tectonic movement, the Gondwana land collided with Eurasian plate resulting in the formation of Himalayas.

• The Himalayas acts as a source for many rivers like the Ganges, the Yamuna, The Indus, The Brahmaputra etc.

• Mount Abu is in the Aravali mountain range (it is residual Mountain range).

• Satpura mountain range (Block Mountains) is in central India.

• Anaimudi is the highest peak in the Western Ghats.

Q78. Answer: (d) C

In only ‘figure C’ we observe that there are two ovals and are touching at two positions. Thus it closely resembles the question figure.

Hence, “C” is the correct answer.

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Q79. Answer: (c) Zygote

• When two germ cells from two individuals combine during sexual reproduction, they form a Zygote.

• When male gametes (Sperm) feud with female gametes (Ovum) then a Zygote is formed.

• Zygote is moved down from the fallopian tubes and attached to wall of Uterus and its called embryo which further develops into Fetus.

Term	Definition
Bud	• It is a type of Asexual reproduction. - Several bulb type projections are found on organisms that follow this type of reproduction as these bulbs later develop into new Individuals and these bulges are called buds.
Spore	• Spore as asexual reproductive bodies found in plants.
Fruit	• After fertilization, the ovaries grow into a fruit.

Q80. Answer: (c) 6.30 p.m.

Shortcut Trick

Total Work (LCM of 8, 12) = 24 units.

Efficiencies: Kuldeep = 3, Agarkar = 2.

In a 2-hour cycle (3 + 2) = 5 units are completed.

In 4 cycles (8 hours), 5 × 4 = 20 units done. Remaining = 4 units.

9^(th) hour: Kuldeep does 3 units. Remaining = 1 unit. 10^(th) hour: Agarkar takes 1/2 hour.

Total time = 9 hours 30 mins. Starting 9 a.m. + 9.5 hours = 6.30 p.m.

Therefore The correct answer is 6.30 p.m.

Alternate Method

Given: Kuldeep (K) = 8 hours, Agarkar (A) = 12 hours. Start time = 9 a.m. (K starts).

Formula Used: Efficiency = Total Work ÷ Time

Person	Days	Total Work	Efficiency
Kuldeep	8	24	3
Agarkar	12	2	

=> Work done in 1^(st) hour (Kuldeep) = 3 units

=> Work done in 2^(nd) hour (Agarkar) = 2 units

=> Total work in 2 hours = 3 + 2 = 5 units

=> Work done in 8 hours (4 cycles) = 5 × 4 = 20 units

=> Remaining work = 24 − 20 = 4 units

=> 9^(th) hour: Kuldeep completes 3 units. Remaining = 4 − 3 = 1 unit

=> 10^(th) hour: Agarkar needs time = 1 ÷ 2 = 0.5 hours (30 minutes)

=> Total duration = 9 hours + 30 minutes = 9 hours 30 minutes

=> Finish Time = 9:00 a.m. + 9 hours 30 mins = 6:30 p.m.

Therefore The correct answer is 6.30 p.m.

Additional Information

Alternate Work Concept

When people work alternately, the work is calculated in cycles. If A starts, the odd hours belong to A and even hours to B.

LCM Method for Work

Total work is assumed as the Least Common Multiple of individual time periods to avoid calculations in fractions.

Time Conversion

Fraction of an hour is converted to minutes by multiplying by 60 (e.g., 1/2 hour = 30 minutes).

Q81. Answer: (d) Mercury

• Mercury (Hg) is in the form of liquid at room temperature.

• Mercury is the only metal in liquid form at room temperature.

• As mercury is sensitive to temperature changes, it is used in the devices that are used to measure temperature.

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• Bromine (Br) is also in liquid form at room temperature but is a non- metal.
• Both lead (Pb) and tungsten (W) is in solid form at room temperature.

Q82. Answer: (c) Sandeep Bakhshi

• The CEO of ICCI bank is Sandeep Bakhshi.
• Chanda Kochhar stepped down for violation of ICCI Banks code of conduct.

Q83. Answer: (c) Rs. 6000

Initial capital with Lalitha = Rs. 20000
=> Percentage of money left with her for other expenses = 100 - 50 - 20 = 30%
Therefore Money left = (30/100) × 20000 = Rs. 6000

Q84. Answer: (c) 2016

• The Income Declaration Scheme was launched by the Income Tax Department of the Government of India in the year 2016.
• The Scheme provides an opportunity to the citizen who has not paid full taxes in the past to come forward and declare the undisclosed income and pay tax, surcharge and penalty totalling in all to forty-five per cent of such undisclosed income declared.
• The declaration must be made between 1^(st) June 2016 to 30^(th) September 2016.

Q85. Answer: (d) Both, Upper and Lower House separately

• A constitution amendment bill must be passed by both lower house (Lok Sabha) and upper houses (Rajya Sabha) of Parliament separately.
• The article 368 (1) provides the Indian Parliament power to amend the Indian constitution.
• A constitutional amendment must be passed by both houses by a special majority (2/3^(rd) of members) of both houses.

Q86. Answer: (b) 330

Factors of 108900 = (2 × 2 × 3 × 3 × 5 × 5 × 11 × 11)
Therefore Square root of 108900 = 2 × 3 × 5 × 11 = 330

Q87. Answer: (c) Rs. 10,000

Percentage of employees in segment 5 = 20%
Percentage of employees in segment 3 = 10%
=> Amount spend on segment 3 is Rs. 5000 i.e. on 10% employees
=> So, the expense on segment 5 i.e. on 20% employees = 2 × 5000 = Rs. 10000
Therefore Expense on segment 5 = Rs. 10000

Q88. Answer: (c) Hydrogen

The correct answer is Hydrogen.
Key Points
• When metals react with water. It liberates hydrogen gas.
• Metals react with water to form a metal oxide and liberate hydrogen gas.
• Metal + Water → Metal oxide + Hydrogen (g)
• Metal oxides that are formed during these reactions, if soluble in water then they from metal hydroxides.
• Metal oxide + Water → Metal hydroxide
• But not all metals react with water, metals like gold, silver, lead etc. do not react with water at all.

Q89. Answer: (d) 11

Given:
$x = y = (\sqrt{(6 - 1)})/(\sqrt{(6 + 1)})$
Concept used:
Here we need not to put the complex value of x and y,
Only put x = y
Calculation
$((3x^2 + 5xy + 3y^2))/((3x^2 - 5xy + 3y^2))$
$=> ((3x^2 + 5x^2 + 3x^2))/((3x^2 - 5x^2 + 3x^2))$
$=> 11x^2/x^2$

=> 11

Q90. Answer: (a) C

The pattern followed here is "∞" is shifting to the next quadrant in a clockwise direction and the inverted L is undergoing mirror image and water image alternatively in each quadrant in a clockwise direction

Q91. Answer: (a) 2.5 m/s²

• The speed gained by the object v is 5m/s

• Time = 2s

• Initial velocity u is 0

• We know that v = u + at

• Now by substituting the values, we get

5 = (2)(a)

a = 2.5

• The acceleration of the object is 2.5 m/s²

Q92. Answer: (c) Both assumption I and II are implicit

Assumption 1 holds as if the sales manager of an area is happy with his work in the area, it can be assumed that he/she has made some progress, or some acquisitions in his/her area. The area sales manager stated that "he is eagerly awaiting to present this year's report to the top management", so we can assume that "The manager has vital information that would make an impression on the top management".

Hence, "Both assumption I and II are implicit".

Q93. Answer: (c) mRNA copy

• A basic event in protein synthesis is the creation of a/an mRNA (Messenger Ribonucleic Acid) copy.

• The mRNA provides the template for the Genetic Code.

• A gene is used to build a protein using the following two step process i.e. Transcription and Translation.

• Transcription: It is the process by which DNA is copied to mRNA, which carries the information needed for protein synthesis.

• Translation: It is the process that takes the information passed from DNA as messenger RNA and turns it into a series of amino acids.

Q94. Answer: (a) Jhulan Goswami

• Jhulan Goswami, an Indian woman cricketer became the highest wicket-taker in Women's ODI in the year 2017.

• In the year 2018, she retired from T20 international Cricket.

• She was the first woman to cross 200 wickets in women's 50 overs ODi and she is also an Ex-Indian Team Captain.

• She has a postal stamp issued in her honor in the year 2018.

Q95. Answer: (a) C

Here, accept Y25, every latter is followed by the number one less than the positon value of that letter,

Ex. S = 19 – 1 = 18 => S18

Hence, "Y25" is the correct answer.

Q96. Answer: (a) Statements 1, 2, 3 and 4 together are sufficient

Let us check every statement individualy,

1. Nitu is the tallest → Data in this statement is inadequate since, only 1 person is mentioned here. Therefore statement 1 alone is not sufficient.

2. Tarun is taller than Manav → Data in this statement is inadequate since, only 2 persons are mentioned here. Therefore statement 2 alone is not sufficient.

3. Hema is the shortest of them all → Data in this statement is inadequate since, only 1 persons is mentioned here. Therefore statement 3 alone is not sufficient.

4. Manav is taller than Priya → Data in this statement is inadequate since, only 2 persons are mentioned here. Therefore statement 4 alone is not sufficient.

Since, no statement alone is sufficient now we can go through the options given,

From 1^(st) option combining all 1, 2, 3, and 4 statement together we get,

Nitu > Tarun > Manav > Priya > Hema

Hence, "Statements 1, 2, 3 and 4 together are sufficient".

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Q97. Answer: (c) National Welfare Fund for Sportsperson

• National Welfare Fund for Sportsperson was set up in the year 1982 to help sportspersons in yesteryears and living in indigent circumstances.

• The annual income required to be eligible for getting financial assistance raised from 2 to 4 lakh.

• Financial assistance to sportsperson living in indigent raised to 5 lakhs and 10 lakhs for any injury sustained during training, 5 lakhs to family in case of death of sportsperson.

Q98. Answer: (d) 10

Shortcut Trick

The sum of an interior angle and an exterior angle of a polygon is always 180°.

Given Ratio = 4 : 1 => Total units = 4 + 1 = 5 units.

5 units = 180° => 1 unit (Exterior angle) = 180° ÷ 5 = 36°.

Number of sides (n) = 360° ÷ Exterior angle = 360° ÷ 36° = 10.

Therefore The correct answer is 10.

Alternate Method

Given: Ratio of Interior angle to Exterior angle = 4 : 1.

Formula Used: Interior angle of a regular polygon = [(n − 2) × 180°] ÷ n; Exterior angle = 360° ÷ n.

=> Let Interior angle = 4x and Exterior angle = 1x.

=> 4x + 1x = 180°

=> 5x = 180° => x = 36°.

=> Exterior angle = 36°.

=> Number of sides (n) = 360° ÷ Exterior angle

=> n = 360° ÷ 36° = 10.

Therefore The correct answer is 10.

Additional Information

Sum of Interior Angles

The sum of all interior angles of a polygon with 'n' sides is (n − 2) × 180°.

Sum of Exterior Angles

The sum of all exterior angles of any convex polygon is always 360°.

Number of Diagonals

The number of diagonals in a polygon with 'n' sides is given by [n(n − 3)] ÷ 2.

Q99. Answer: (c) Both I and II are implicit.

Assumption 1 follows because laughter does not depend on area, family background, genetics, etc, and as therapy is ‘simple’ and ‘universal’. Assumption 2 follows because it is a proven scientific fact.

Hence, “Both assumptions I and II are implicit”.

Q100. Answer: (d) 20 days

Shortcut Trick

Total Capacity of tank in litres = 15 × 8 × 6 × 1000 = 720,000 litres.

Daily Consumption of village = 4000 × 9 = 36,000 litres/day.

Number of days = Total Capacity ÷ Daily Consumption = 720,000 ÷ 36,000 = 20 days.

Therefore The correct answer is 20 days.

Alternate Method

Given:

Population = 4000 | Water/person = 9 litres | Dimensions = 15 m × 8 m × 6 m

Formula Used:

Volume of cuboid = Length × Breadth × Height

Conversion: 1 m^3 = 1000 litres

Calculations:

=> Volume of tank = 15 × 8 × 6 = 720 m^3

=> Capacity in litres = 720 × 1000 = 7,20,000 litres

=> Total daily requirement = 4000 × 9 = 36,000 litres

=> Number of days = 7,20,000 ÷ 36,000

=> Number of days = 20 days

Therefore The correct answer is 20 days.

Additional Information

Volume of Cuboid

The total space occupied by a cuboidal object is calculated as V = l × b × h.

Unit Conversion

Standard conversion for water capacity: 1 cubic metre (m^3) equals 1000 litres (L).

Surface Area of Cuboid

Total Surface Area (TSA) = 2(lb + bh + hl) and Lateral Surface Area (LSA) = 2h(l + b).

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