RRC Group D Previous Year Paper 41 (Held On: 16 Oct 2018 Shift 2)

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

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CBT

Q1. Latika and her friend are seated at a restaurant facing each other. Latika is facing west. The waiter comes to take the order and stands at 90° to the right of Latika. In which direction is the waiter facing?

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

Q2. If + means ÷, ÷ means -, - means ×, × means +, then find the value of the following expression: 84 + 2 ÷ 4 – 6 × 12 = ?

(a) 30
(b) 20
(c) 14
(d) 18

Q3. Who won the gold medal at 2018 FIG artistic Gymnastics world Challenge Cup?

(a) Pranati Das
(b) Dipa Karamakar
(c) Pranati Nayak
(d) Aruna Reddy

Q4. A car covers a certain distance in 8 hrs. It covers half distance at speed of 40 km/hr and the other half at the speed of 60 km/hr. Find the distance of the journey.

(a) 384 kms
(b) 368 kms
(c) 388 kms
(d) 944 kms

Q5. Vansda National Park is in _____

(a) Assam
(b) Uttarkhand
(c) Punjab
(d) Gujarat

Q6. Which scientist provided the basic theory about the nature of matter?

(a) Democritus
(b) Joseph Proust
(c) John Dalton
(d) Antoine Lavoisier

Q7. _____ is present in tomato.

(a) Tartaric Acid
(b) Oxalic Acid
(c) Acetic Acid
(d) None of these

Q8. Who is the Dirctor of the movie 'Newton', released in 2017?

(a) Saket Chaudhary
(b) Anurag Kashyap
(c) Amit V. Masurkar
(d) K. Raghavender Rao

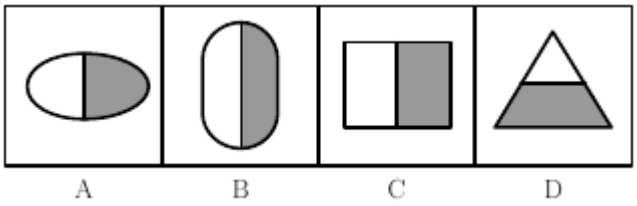
Q9. Which of the following metals is used to make electrical wires?

(a) Copper
(b) Silver
(c) Lead
(d) Magnesium

Q10. If $4x^3 – 2x^2 + 5x – 8$ is divided by $(x – 2)$, what will be the remainder?

(a) 42
(b) 26
(c) 81
(d) 16

Q11. Choose the odd one out form among the give figures.



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

Q12. In _____, a major upheaval took place that shook the foundation of British Rule and is often referred to as the 'First War of Independence.

(a) 1856
(b) 1875
(c) 1947
(d) 1857

Q13. Ravish Kumar a journalist, is associated with which of the following news channels?

(a) NDTV
(b) Rajya Sabha TV
(c) Republic TV
(d) Times Now

Q14. Fill in the blank in the following sentence from the options given below.

_____is a true fish.

(a) Dog fish
(b) Jelly fish
(c) Snakes

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(d) Cattle fish

Q15. The 2^(nd) and 3^(rd) periods contain:

(a) 8 elements
(b) 1 element
(c) 6 elements
(d) 4 elements

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:

Like an Indian pilot, I decided to become a pilot.

Assumption:

I. I am not a pilot

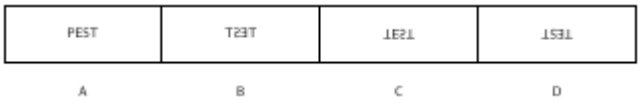
II. I am a pilot

(a) Either assumption I or II is implicit
(b) Only assumption II is implicit
(c) Both assumptions I and II are implicit
(d) Only assumption I is implicit

Q17. The distance covered by an object in unit time is called _____.

(a) distance
(b) displacement
(c) average speed
(d) average velocity

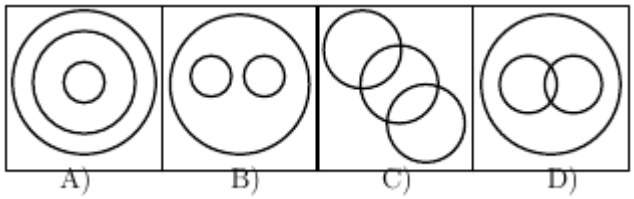
Q18. What is the lateral mirror image of PEST?



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

Q19. Identify the diagram that best represents the relationship among the classes given.

Body, Veins, Blood.



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

Q20. Consider the following question and decide which of the statements is sufficient to answer the question.

Question:

Find the total sum of first ‘n’ natural numbers

Statements:

I. s_n = (n(n + 1))/2, where n = 50

II. In the given numbers, some are even and some are odd.

(a) Only statement I is sufficient
(b) Both statements I and II are sufficient
(c) Only statement II is sufficient
(d) Either statement I or II is sufficient

Q21. The sum of two numbers is 90. If one of them exceeds the other by 16, find both the numbers?

(a) 50, 40
(b) 53, 37
(c) 64, 48
(d) 43, 47

Q22. A train is running at an average speed of 82 km/hr. How much distance will it cover in 24 minutes?

(a) 29.4 km
(b) 31.2 km
(c) 32.8 km
(d) 28.6 km

Q23. 6% of a sugar solution is sugar. If the volume of the solution is 350 ml, how much water is there in it?

(a) 332.5 ml
(b) 325.5 ml
(c) 322 ml
(d) 329 ml

Q24. A 5 Ω resistance wire is doubled on it. Calculate the new resistance of the wire.

(a) 1.25 Ω
(b) 2.25 Ω
(c) 1.5 Ω
(d) 1.00 Ω

Q25. Which of the following statements is correct?

(a) The weight of a body in an elevator moving downwards decreases while its Mass remains the same.
(b) The weight as well as the Mass of a body in an elevator moving downwards decreases.
(c) The Weight of the body in an elevator moving downwards increases while its mass remains the same.
(d) The Weight and the Mass of the body in an elevator moving downwards do not change.

Q26. Which is the number that should come next in the following series?

2, 4, 6, 12, 14, 28, 30, _____

(a) 62
(b) 60
(c) 32
(d) 34

Q27. Consider the following statement and decide which of the assumptions is implicit from the statement.

Statement:

It is important to involve children in various co-curricular activities.

Assumptions:

I. Holistic development occurs through various co-curricular activities.

II. Schools don’t admit without co-curricular activities

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

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Q28. Which of the following fractions is the greatest?

(a) 5/14
(b) 29/77
(c) 25/66
(d) 8/21

Q29. The focal length of a convex mirror is:

(a) negative
(b) zero
(c) positive
(d) infinite

Q30. Pipe A and B can fill the tank in 10 hrs and 15 hrs respectively. Both can fill the tank together in ____hrs.

(a) 6 : 15
(b) 6
(c) 6 : 10
(d) 4

Q31. What is the smallest fraction among the below given fractions?

4/9, 5/4, 3/8, 6/7

(a) 6/7
(b) 5/4
(c) 4/9
(d) 3/8

Q32. If x = cos^(-1) (cos 4) and y = sin^(-1) (sin 3), then which of the following conditions is true?

(a) tan (x – y) = tan 1/2
(b) x + 2y = 2
(c) tan (x + y) = - tan7
(d) x + y + 1 = 0

Q33. If $x^2 + y^2 = 156$ and x – y = 12, then xy = ?

(a) 8
(b) 13
(c) 11
(d) 6

Q34. Y and Z go on a bike ride starting early morning facing the opposite direction of the Sun. They approach a cross road. Z takes the left turn and Y goes to the right. After travelling for 1 km, Y turns 45° to his right to reach a cross road. In which direction is Y heading?

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

Q35. The political party that came into power after the national emergency was _____.

(a) Bahujan Samaj Party
(b) Congress
(c) Indian National Congress
(d) Janata Party

Q36. _____ give birth to very poorly developed young ones.

(a) Bats
(b) Rats
(c) Kangaroos

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(d) Cats

Q37. Dachigam National Park is in _____.

(a) Jammu and Kashmir
(b) Kerala
(c) Sikkim
(d) Uttarakhand

Q38. What is the mean of the following data?

Class Interval	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Frequency	8	12	16	11	13

(a) 12
(b) 23.4
(c) 36.5
(d) 42.7

Q39. 'Ladies First' is a 2017 documentary based on the life of which Indian archer?

(a) Deepika Kumari
(b) Rahul Banerjee
(c) Tarundeep Rai
(d) Jayanta Talukdar

Q40. In what time will Rs. 1,800 yield simple interest of Rs. 390 at the rate of 5% per annum?

(a) 5 years, 4 months
(b) 5 years, 2 months
(c) 4 years, 2 months
(d) 4 years, 4 months

Q41. On which of the following factors does the magnitude of the buoyant force acting on a body in a given fluid depend?

(a) Weight of the body immersed in it
(b) Shape of the body immersed in the fluid.
(c) Density of the fluid and mass of the body immersed in it
(d) Density of the fluid and the volume of the body immersed in it

Q42. A tank can be filled by tap A in 4 hours while tap B can fill the same in 6 hours. Tap C can empty the filled tank in 8 hours. If all the three taps are opened simultaneously, how much approximate time will be taken to fill the tank completely?

(a) 3 hours, 26 minutes
(b) 2 hours, 26 minutes
(c) 3 hours, 16 minutes
(d) 3 hours, 20 minutes

Q43. The number of _____ is equal to the difference between the mass number of the atom and the atomic number.

(a) Both protons and electrons
(b) Neutrons
(c) Electrons
(d) Protons

Q44. Find the next number in the given series.

4, 17, 43, 82, ?

(a) 130
(b) 134
(c) 120
(d) 132

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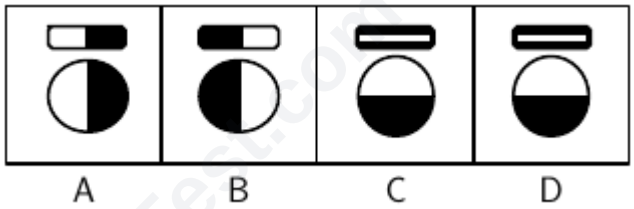
Q45. Which of the following reproduces by spore formation?

(a) Planaria
(b) Bryophyllum
(c) Hydra
(d) Rhizopus

Q46. The value of 8.53 + 6.6 × 0.8 - 1.17 ÷ 0.09 is:

(a) 12.51
(b) 0.81
(c) 5.91
(d) 7.758

Q47. Choose the odd one out from among the given figures.



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

Q48. What fraction of a day are 7 minutes 12 seconds?

(a) 1/300
(b) 1/200
(c) 1/240
(d) 1/225

Q49. You are given a question and two statements. Identify which of the statements is/are necessary / sufficient to answer the question.

Question: Beena is elder than Meena and Swathi is younger than Kavi. Who among them is the youngest?

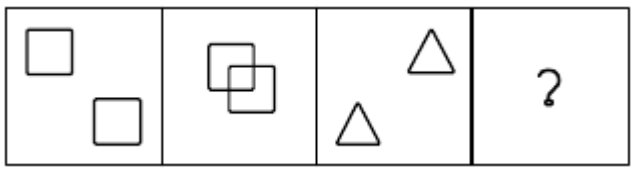
Statements:

I. Swathi is younger than Beena.

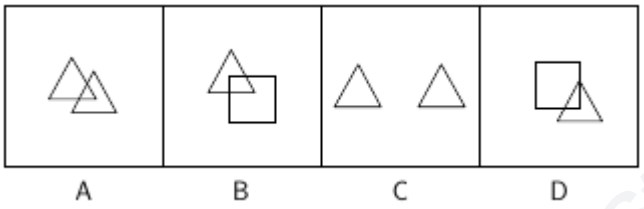
II. Kavi is younger than Meena.

(a) Data either in I alone or II alone are sufficient
(b) Data in both I and II together are necessary
(c) Data in I alone is sufficient
(d) Data in II alone is sufficient

Q50. Study the following pattern and select the figure that relates to the third figure in the same way that the second figure relates to the first figure:



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

Q51. Consider the following statements to be true even if they seem to be at variance from commonly known facts and decide which of the conclusions logically follows form the statements.

Statements:

Some tigers are cats.

All cats are rats

Conclusions:

1. All rats are cats.

2. Some of the tigers are rats.

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

Q52. _____ is the sequence of gradual changes that take place in the primitive organisms over millions of years, resulting in the formation of new species.

(a) Evolution
(b) Fossils
(c) Analogous organs
(d) Homologous organs

Q53. A can do a work in 5 days while B can do the same work in 8 days. They worked together to complete the work and earned Rs. 6760. Find A's share?

(a) Rs. 5070
(b) Rs. 3600
(c) Rs. 4160
(d) Rs. 4056

Q54. Find the value of tan 8° tan 22° cot 60° tan 68° tan 82°

(a) √3
(b) 1
(c) 2/√3
(d) 1/√3

Q55. Who is India's youngest female climber who scaled Mount Everest?

(a) Deepika Rathore
(b) Premlata Agarwal
(c) Shivangi Pathak
(d) Bachendri Pal

Q56. Which of the following is combined to form Solder?

(a) Lead and copper
(b) Tine and iron
(c) Lead and iron

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(d) Lead and tin

Q57. M sold a printer to N at a profit of 10%, and N sold it to P at a profit of 4%. If P paid Rs. 14,300, what was the cost price to M?

(a) Rs. 12,500
(b) Rs.12,355
(c) Rs. 12,300
(d) Rs. 12,480

Q58. Read the following statements and the conclusions that follow. Decide which of the two conclusions follow from the given statements.

Statements:

Some bulbs are lights.

All lights are lamps.

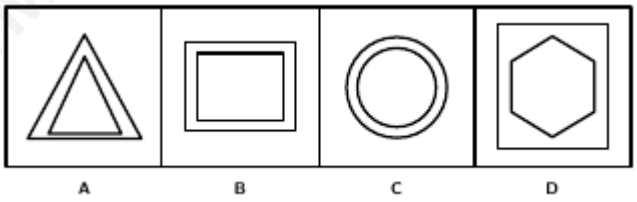
Conclusions:

1. Some bulbs are lamps.

2. No light is a bulb.

(a) Either 1 or 2 follows
(b) Only conclusion 2 follows
(c) Only conclusion 1 follows
(d) Both conclusions 1 and 2 follow

Q59. Choose the odd one out from among the given figures:



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

Q60. By selling a book for Rs. 31 a person loses 7% of his outlay. If he sells the same book for Rs. 35, the bargain is:

(a) 5% loss
(b) 5% profit
(c) 6% profit
(d) 4.5% loss

Q61. Rashtriya Krishi vikas Yojana is a scheme of Government of India launched for the benefit of:

(a) School teachers
(b) Agriculture & farmers
(c) Industries
(d) Hospitals

Q62. Who topped the Forbes Global Game Changers List in 2017?

(a) Narendra Modi
(b) Kumar Mangalam Birla
(c) Mukesh Ambani
(d) Anil Ambani

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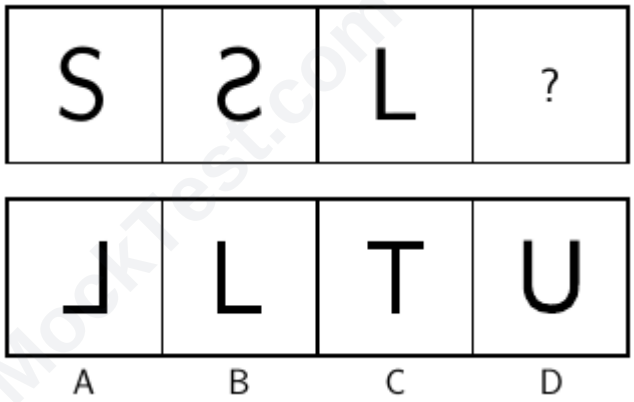
Q63. The tenth term of an A.P √2 ,3√2, 5√2, 7√2 …..is :

(a) 11√2
(b) 12
(c) 10√2
(d) 19√2

Q64. 22 February 2002 was a Friday. What day of the week was it on 15 March 2008?

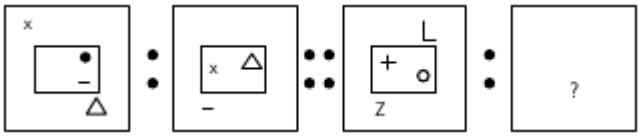
(a) Monday
(b) Friday
(c) Sunday
(d) Saturday

Q65. What is the next figure in the given series?

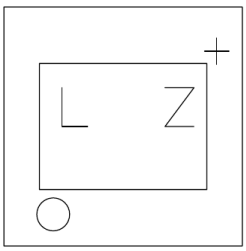


(a) D
(b) A
(c) C
(d) B

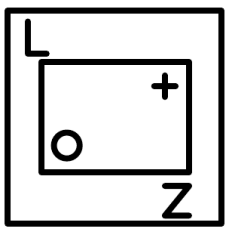
Q66. Select the missing figure that will complete the following anlogy.



(a)

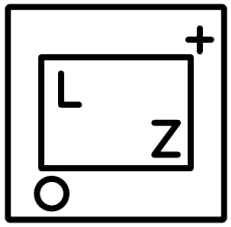


(b)

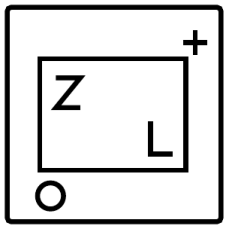


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(c)



(d)



Q67. In 2017, The Union Government announced a recapitalisation plan for public sector banks to infuse capital of _____ over the next two years.

(a) Rs. 31 lakh crore
(b) Rs. 21 lakh crore
(c) Rs. 11.2 lakh crore
(d) Rs. 2.11 lakh crore

Q68. If 17 January 2004 was Saturday, what day of the week was it on 10 April 2013?

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

Q69. The Suggestion of organising Asian Games was first made at _____.

(a) The Conference of Asian Countries, New Delhi in 1947
(b) The Conference of Asian Countries, New Delhi in 1952
(c) The Conference of Asian Countries, New Delhi in 1943
(d) The Conference of Asian Countries, New Delhi in 1956

Q70. Consider the following statement and decide which of the assumptions is implicit from the statement.

Statement:

I like school teachers and decided to become a teacher.

Assumptions:

I. I am not a school teacher.

II. I am a school teacher.

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

Q71. Which of the following plant hormones inhibits growth?

(a) Cytokinins
(b) Abscisic acid
(c) Gibberellins
(d) auxins

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Q72. An object of mass m is raised to a height 4h above ground level. Find the potential energy of the object.

(a) 8 mgh
(b) ¼ mgh
(c) 4 mgh
(d) 0.4 mgh

Q73. If '<' is treated as '+' and '×' is treated as '÷', then what will be the value of
([(25 < 15)] × 4) < 1 ?

(a) 11
(b) 5
(c) 20
(d) 13

Q74. Which acid does an ant sting possess?

(a) Methanoic acid
(b) Oxalic acid
(c) Lactic acid
(d) Citric acid

Q75. If VISITORS is written as IVISOTSR in a certain code, how would STATUS be written in that code?

(a) TSSUTA
(b) TTUSAS
(c) TUASUT
(d) TSTASU

Q76. In a certain code CREATION is coded as BQDZSHNM. How is PRODUCTION written in that code?

(a) OQNCTBSHNM
(b) OQMETBSHNM
(c) OQNETBSHNM
(d) OQMCTBSHNM

Q77. In the following number series, one missing term is shown by '?'. Choose the missing term from the options below.
6, 12, 20, 30, ?, 56, 72

(a) 40
(b) 42
(c) 44
(d) 48

Q78. With a daily earning of nearly Rs. 10 crore, ____ is the largest jewellery market in uttar Pradesh.

(a) Meerut
(b) Firozabad
(c) Noida
(d) Saharanpur

Q79. Name the Group in the Modern Periodic Table which has elements that are all gases.

(a) Group 18
(b) Group 10
(c) Group 12
(d) Group 14

Q80. The value of √((3√9 - 3√8)(9 + 2√18))

(a) 3
(b) 4
(c) 2
(d) 9

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Q81. Which of the following won the Best Film award at the 63^(rd) Jio Filmfare Awards 2018?

(a) Toilet-Ek Prem Katha
(b) Newton
(c) Rustom
(d) Hindi Medium

Q82. What does the flagship Pradhan Mantri Awas Yojana Scheme promote?

(a) Affordable water
(b) Affordable housing
(c) Affordable power
(d) Affordable education

Q83. Which of the expressions given below represents the square root of (3^(38) + 3^(39))

(a) 6^(38.5)
(b) √2 × 3^(19.25)
(c) 3^(38.5)
(d) 2 × 3^(19)

Q84. Normal ray, incident ray and reflected ray lie on the same plane in _____.

(a) Reflection
(b) Refraction
(c) Refractive index
(d) Both Reflection and Refraction

Q85. Who is the Chief Editor of the news channel Republic TV?

(a) Arnab Goswami
(b) Anjana Om Kashyap
(c) Sonia Singh
(d) Ravish Kumar

Q86. Sound travel through air and reaches our ears to give us _____.

(a) loudness of sound
(b) music
(c) frequency of sound
(d) sensation of sound

Q87. A boy of mass 50 kg runs up a staircase of 45 steps in 9 s. If the height of each step is 15 cm, find his power. Given, g = 10 ms^(-2)

(a) 375 W
(b) 275 W
(c) 275 J
(d) 375 J

Q88. The National Mission for Saffron is a launched as a sub-scheme under which of the following?

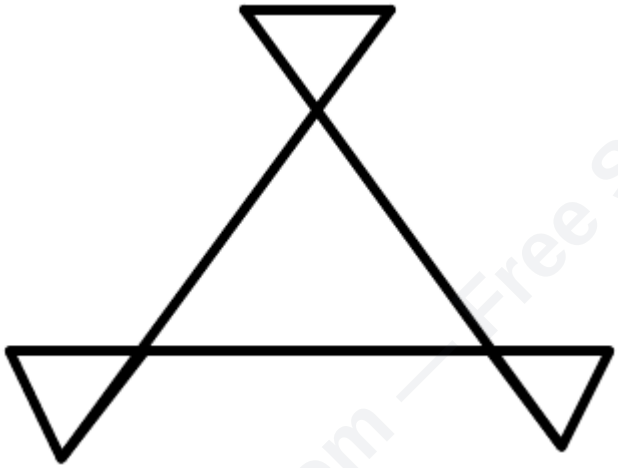
(a) Kaushal Vikas Yojana
(b) Krishi Vikas Yojana
(c) Antyodaya Yojana
(d) Gram Jyoti Yojana

Q89. Which of the following statements is INCORRECT?

(a) Action and reaction forces act on different bodies
(b) An isolated force does not exist
(c) Forces exist in pairs
(d) Action and reaction forces act on the same body

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Q90. Find the number of triangles in the following figure:



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

Q91. 'Park' is related to 'Bench' in the same way 'restaurant' is related to _____.
(a) 'Table'
(b) 'Hotel'
(c) 'Waiter'
(d) 'Counter'

Q92. Select the option that is related to the third word on the same basis as the second word is related to the first word.
Petrol : car ? Electricity :
(a) Bulb
(b) Room
(c) Dark
(d) Goods

Q93. `Given below is a statement followed by some conclusions. You have to take the given statement to be true even if it seems to be at variance with the commonly known facts and then decide which of the given conclusions logically follow(s) from the given statement.
Statement:
Success cannot be achieved without hard work.
Conclusions:
I. Every hard working person is successful.
II. Every successful person is hardworking.
(a) Only conclusion I follows
(b) Only conclusion II follows
(c) Both I and II follow
(d) Neither of them follows

Q94. Why do particles in liquid water at 0° C have more energy as compared to particles in ice at the same temperature?
(a) Because the particles in water heat energy during the process of conversion form ice to liquid water.
(b) Because the particles in water absorb heat energy during the process of conversion from ice to water vapour.
(c) Because the particles in water radiate heat energy during the process of conversion from ice to liquid water.
(d) Because the particles in ice absorb heat energy during the process of conversion from ice to liquid water.

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Q95. An electron possesses a negative charge of:

(a) 1.6 × 10^(+18)C
(b) 1.6 × 10^(-19)C
(c) 1.6 × 10^(-18)C
(d) 1.6 × 10^(-16)C

Q96. If 3x – y = 5, find the value of 8^x/2^y.

(a) 32
(b) 64
(c) 256
(d) 16

Q97. In _____, Sir William Jones set up the Asiatic Society of Bengal.

(a) 1783
(b) 1785
(c) 1784
(d) 1786

Q98. According to the Economic Survey of 2017-18, the share of MSME sector in the country's Gross value Added (GVA) is _____.

(a) 23%
(b) 32%
(c) 18%
(d) 42%

Q99. Read the given question and decide which of the following statements is/are sufficient to answer the question.

Question:

M, O, P and Q are standing in a queue. Who is standing at the farther end of the queue?

Statements:

1. M is at the counter interacting with the staff.
2. O and P are standing in between M and Q.

(a) Statement 2 alone is sufficient
(b) Statements 1 and 2 together are insufficient
(c) Statements 1 and 2 together are sufficient.
(d) Statement 1 alone is sufficient.

Q100. If 4 : 5 ? 7 : x, then the value of x will be

(a) 9.25
(b) 8.5
(c) 9.5
(d) 8.75

ANSWER KEY

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

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81	d	82	b	83	d	84	a	85	a	86	d	87	a	88	b	89	d	90	b
91	a	92	a	93	b	94	d	95	b	96	a	97	c	98	b	99	c	100	d

SOLUTIONS

Q1. Answer: (a) South

According to the given information,

Latika is facing west and waiter stands at 90° to the right of Latika and facing her. So the waiter is facing the south direction as shown in the diagram.

Hence, “South” is the correct answer.

Q2. Answer: (a) 30

Symbol	Meaning
•	÷
÷	•
•	×
×	•

After changing the signs in the equation 84 + 2 ÷ 4 – 6 × 12 the equation becomes 84 ÷ 2 – 4 × 6 + 12

Now solving according to BODMAS rule the equation

42 - 24 + 12 = 30

Hence, “30” is the correct answer.

Q3. Answer: (b) Dipa Karamakar

The correct answer is Dipa Karmakar.

Key Points

• Dipa Karmakar, India’s premier gymnast clinched the gold medal in the vault event of FIG Artistic Gymnastics World Challenge Cup at Mersin, Turkey.

• She created history by becoming the first Indian woman to qualify in the individual Vault finals in the Rio Olympics 2016.

• Dipa won a bronze medal at the 2014 Commonwealth Games in Glasgow.

• She becomes the first Indian female gymnast to do so in the history of the Games.

• She is only the fifth woman in gymnastics history to land the Produnova vault.

Important Points

Prana Das	**• Women's Artistic Gymnastics. - She Competing in the team all-around final at the 2018 Commonwealth Games in Gold Coast, QLD, Australia.**
Pranati Nayak	• She won bronze in a vault at the 2019 Asian Championships in Ulaanbaatar, Mongolia.
Aruna Reddy	• She became the first Indian gymnast to clinch an individual medal at the Gymnastics World Cup 2018 in Melbourne by securing bronze in the women's vault.

Q4. Answer: (a) 384 kms

Shortcut Trick

Average Speed for equal distance segments = (2 × S1 × S2) ÷ (S1 + S2)

Average Speed = (2 × 40 × 60) ÷ (40 + 60) = 4800 ÷ 100 = 48 kmph

Total Distance = Average Speed × Total Time = 48 × 8 = 384 km

Therefore The correct answer is 384 kms.

Alternate Method

Given:

Speed 1 (S1) = 40 km/hr

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Speed 2 (S2) = 60 km/hr
Total Time (T) = 8 hours
Formula Used:
Time = Distance ÷ Speed
Calculations:
Let the total distance be 2D. Then each half is D.
=> Time taken for first half (t1) = D / 40
=> Time taken for second half (t2) = D / 60
=> t1 + t2 = 8
=> (D / 40) + (D / 60) = 8
=> (3D + 2D) / 120 = 8
=> 5D / 120 = 8
=> D / 24 = 8
=> D = 24 × 8 = 192 km
=> Total Distance = 2D = 2 × 192 = 384 km
Therefore The correct answer is 384 kms.
Additional Information
Average Speed (Equal Distances)
When a journey is divided into two equal distances with speeds x and y, the average speed is given by (2xy) ÷ (x + y).
Average Speed (General Formula)
Average Speed = Total Distance Covered ÷ Total Time Taken.
Relative Speed
If two objects move in opposite directions, relative speed = S1 + S2. In same direction, relative speed = |S1 − S2|.

Q5. Answer: (d) Gujarat

The correct answer is Gujarat.
Key Points
• Vansda National Park is located in the Navsari district, Gujarat.
• The total area of the park is about 23.99 Km².
• The park got its name Vansda as the area was privately owned by the Maharaja of Vansda.
• It was established as a National park in the year in 1979.
• The area having groves of “Katas” bamboo owes its beauty to no felling of trees since 1952.
Important Points

STATE	NATIONAL PARK
Assam	Dibru-Saikhowa National Park, Kaziranga National Park, Manas National Park, Nameri National Park, Orang National Park.
Uttarakhand	Gangotri National Park, Jim Corbett National Park, Nanda Devi National Park, Rajaji National Park, Valley of Flowers National Park.
Punjab	Harike Wetland
Gujarat	Blackbuck National Park, Velavadar, Gir Forest National Park, Marine National Park, Gulf of Kutch.

Q6. Answer: (c) John Dalton

The correct answer is John Dalton.
Key Points
• The postulates of Dalton’s atomic theory:
• The matter is composed of exceedingly small particles called atoms.
• An atom is the smallest unit of an element that can participate in a chemical change.
• An element consists of only one type of atom, which has a mass that is characteristic of the element and is the same for all atoms of that element.

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• Atoms of one element differ in properties from atoms of all other elements.
• Atoms are neither created nor destroyed during a chemical change.
• Dalton used three laws of chemical reactions as a basis for his theory:
• The Law of Conservation of Mass.
• The Law of Definite Proportions.
• The Law of Multiple Proportions.

Important Points

Democritus	**• He was a Greek philosopher. - He developed the concept of the 'atom'. - Democritus believed that everything in the universe was made up of atoms.**
Joseph Proust	• He demonstrated that all samples of a pure compound contain the same elements in the same proportion by mass. - This statement is known as the law of definite proportions or the law of constant composition.
Antoine Lavoisier	• The law of conservation of mass was discovered by the French chemist, Antoine Lavoisier. - The law states that atoms are neither created nor destroyed during a chemical change; the total mass of matter present when matter changes from one type to another remains constant.

Q7. Answer: (b) Oxalic Acid

The correct answer is Oxalic Acid.
• Oxalic acid is present in tomatoes.
• Tomatoes are a good source of vitamin C and potassium.
• Other acids like citric acid and ascorbic acid are also present in tomatoes.

Important Points

ACID	PRESENT IN
Tartaric Acid	Tamarind, Grapes
Ascorbic Acid	Oranges, lemon, citrus fruits
Acetic Acid	Vinegar, Pickle

Q8. Answer: (c) Amit V. Masurkar

The correct answer is Amit V. Masurkar.

Key Points

• Newton is a 2017 Indian comedy-drama film directed by Amit V. Masurkar.
• He directed the independent comedy film Sulemani Keeda in 2013.
• Newton' is India's official entry for Oscars 2018.
• The National Award-winning actor Rajkummar Rao plays the lead in this movie.

Important Points

DIRECTOR	MOVIES
Saket Chaudhary	Hindi Medium, Phir Bhi Dil Hai Hindustani,
Anurag Kashyap	Black Friday, Dev.D, Gulaal, Mumbai Cutting, Bombay Talkies, Bombay Velvet, Sacred Games, Choked
K. Raghavender Rao	Babu, Annamayya, Pelli Sandadi, Allari Priyudu, Bobbili Brahmanna

Q9. Answer: (a) Copper

The correct answer is Copper.

Key Points

• Copper has been used in electrical wiring since the invention of the electromagnet and the telegraph in the early 1800s.
• Copper electrical connectors are still used in telecommunications, as well as power generation, distribution, and transmission.

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• The lower the level of resistivity, the more electrical conductivity a metal has.
• Copper has low resistivity and therefore is an excellent conductor.
• Copper is less oxidative than other metals, this is another reason.

Important Points

• The electrical resistivity of particular conductor material is a measure of how strongly the material opposes the flow of electric current through it.

METAL	RESISTIVITY (ohm meter)	CONDUCTIVITY (Siemens/m)
Copper	1.72 x 10^(-8)	5.96×10^7
Silver	1.59×10^(−8)	6.30×10^7
Lead	2.20×10^(−7)	4.55×10^6

Q10. Answer: (b) 26

Shortcut Trick

Apply Remainder Theorem: If a polynomial P(x) is divided by (x − a), the remainder is P(a).

Here, divisor is (x − 2), so a = 2.

Remainder = $4(2)^3 - 2(2)^2 + 5(2) - 8$

Remainder = 32 − 8 + 10 − 8 = 26.

Therefore The correct answer is 26.

Alternate Method

Given:

Polynomial $P(x) = 4x^3 - 2x^2 + 5x - 8$

Divisor D(x) = x − 2

Formula Used:

For a divisor (x − a), the Remainder R = P(a).

Calculations:

=> To find the remainder, substitute x = 2 into P(x).

=> $P(2) = 4(2)^3 - 2(2)^2 + 5(2) - 8$

=> P(2) = 4(8) − 2(4) + 10 − 8

=> P(2) = 32 − 8 + 10 − 8

=> P(2) = 24 + 2

=> P(2) = 26

Therefore The correct answer is 26.

Additional Information

Remainder Theorem

It states that the remainder of the division of a polynomial f(x) by a linear invariant (x − a) is equal to f(a).

Factor Theorem

A special case of the remainder theorem where if f(a) = 0, then (x − a) is a factor of the polynomial f(x).

Synthetic Division

A shorthand method of polynomial division, especially for division by a linear factor, useful for finding roots and remainders quickly.

Q11. Answer: (b) D

In diagram A, B, C half of the area is black and other half area is white but in diagram D one fourth of the area is white and three fourth of the area is black. So, diagram D is the odd one out.

Hence, “Figure D” is the correct answer.

Q12. Answer: (d) 1857

The correct answer is 1857.

Important Points

• The revolt of 1857 started on 10th May when the Company’s Indian soldiers at Meerut rebelled.
• It is also called the Sepoy Mutiny by the British.

• It is now also known as the 'First War of Independence' against the British rulers.

• Their policy of annexation called Doctrine of Lapse led to many independent kingdoms being annexed to the British Empire.

• Lord Dalhousie annexed the Maratha States of Satara, Nagpur, Jhansi, and several other minor kingdoms.

• The main event which became the immediate cause of the war was the refusal of the Sepoys to use the grease-covered cartridges (greased with the fat of pig and cow) on January 23, 1857.

• At the same time, an Indian sepoy killed two British officers at Barrackpore, when he was forced to use greased cartridges.

• First came the desperate struggles at Delhi, Kanpur, and Lucknow during the summer; then the operations around Lucknow in the winter of 1857–58, directed by Sir Colin Campbell; and finally the “mopping up” campaigns of Sir Hugh Rose in early 1858.

Q13. Answer: (a) NDTV

The correct answer is NDTV.

Key Points

• Ravish Kumar is New Delhi Television Network (NDTV) India's senior executive editor and one of India's most influential TV journalists.

• He has been reporting real-life and under-reported problems of ordinary common people.

• He hosts many programs include Prime Time, Hum Log, Ravish Ki Report, and Des Ki Baat.

• Television journalist Ravish Kumar was honored with the prestigious Ramon Magsaysay Award 2019 for giving "voice to the voiceless".

• He was awarded Red Ink Award for Journalist of the Year in 2016.

Q14. Answer: (a) Dog fish

The correct answer is Dog fish.

Key Points

• Dogfish is a true fish, amongst Jellyfish, Snake, Dogfish, and Cattle fish.

• Dogfish has all character of fish has, like a cartilaginous skeleton, vertebra, gill slits, fins, etc.

• Jellyfish can not be listed as a fish because it does not meet the requirements of being a fish.

• Cuttlefish are the mollusc of the order Sepiida, belonging to the class Cephalopoda.

Additional Information

• Flying fish, Skatefish, Sturgeon are true fish.

• Silverfish, Starfish, Shrimp fish are not true fish.

Q15. Answer: (a) 8 elements

The correct answer is 8 elements.

Key Points

• The second and third periods contain 8 elements each and are called short periods.

• The 2nd-period elements: lithium, beryllium, boron, carbon, nitrogen, oxygen, fluorine, and neon.

• The 3rd-period elements: sodium, magnesium, aluminum, silicon, phosphorus, sulfur, chlorine, and argon.

• The First period contains 2 elements (Hydrogen, Helium) and is called a very short period.

Important Points

• All the elements in the periodic table are arranged in the order of their increasing atomic number.

• Each period in the periodic table starts with the beginning of a new energy level.

• The first period begins with the filling of the first energy shell (K-shell).

• The first energy shell can accommodate only 2 electrons in it.

• The second period begins with the filling of the second energy shell (L-shell).

• The second energy shell can accommodate only 8 electrons in it.

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

• The statement says that I have made the decision to become a pilot.

• So, this is implicit that you would decide to become a pilot only if you are not one.

• Thus, assumption I is implicit.

• Assumption II contradicts assumption I. Thus, only one of the two assumptions can be implicit.

Hence, “Only assumption I is implicit” is the correct answer.

Q17. Answer: (c) average speed

The correct answer is the average speed.

Key Points

• Speed is the scalar measure of the rate of movement of a body expressed either as the distance traveled divided by the time taken.

• Distance is a scalar quantity that refers to "how much ground an object has covered" during its motion.

• Displacement is a vector quantity that refers to "how far out of place an object is".

• It is the object's overall change in position.

• Average speed is the average of all instantaneous speeds. It is found simply by a distance/time ratio.

• Velocity is defined as a vector measurement of the rate and direction of motion of an object.

• Velocity formula when an object moving in a straight line: r = d / t.

• r is the rate or speed, d is the distance moved, t is the time it takes to complete the movement.

• A body moving with a constant speed has velocity without acceleration.

Q18. Answer: (c) B

Hence, “Diagram B” is the correct answer.

Q19. Answer: (c) A

As Blood flows in Veins and Veins are inside the body so the Body is represented by the larger circle and in which the middle circle and the smaller circle represents Veins and Blood respectively. Hence, the answer is figure A.

Q20. Answer: (a) Only statement I is sufficient

Shortcut Trick

To find the sum of natural numbers, we need the specific value of n.

Statement I provides both the formula and the exact value of n (n = 50).

Statement II is a general property of numbers and does not provide any numerical value to calculate a sum.

Therefore The correct answer is Only statement I is sufficient.

Alternate Method

Given:

Target: Find the sum of the first n natural numbers.

Statement I: $s_n = (n(n + 1))/2$ and n = 50.

Statement II: Some numbers are even and some are odd.

Calculation:

Using Statement I:

=> Sum S50 = [50 × (50 + 1)] ÷ 2

=> S50 = [50 × 51] ÷ 2

=> S50 = 25 × 51 = 1275

=> Statement I alone is sufficient to give a unique value.

Using Statement II:

=> Knowing that numbers are even or odd is a universal fact but provides no numerical limit for n.

=> Statement II alone is not sufficient.

Therefore The correct answer is Only statement I is sufficient.

Additional Information

Sum of First n Natural Numbers

The formula for the sum of the first n natural numbers is always $S_n = n(n + 1) ÷ 2$.

Sum of Squares and Cubes

Sum of squares of first n numbers = [n(n + 1)(2n + 1)] ÷ 6. Sum of cubes = $[n(n + 1) ÷ 2]^2$.

Data Sufficiency Tip

In data sufficiency, if one statement provides a definite numerical value for the variable required in the formula, it is usually sufficient.

Q21. Answer: (b) 53, 37

Shortcut Trick

Larger number = (Sum + Difference) ÷ 2 = (90 + 16) ÷ 2 = 106 ÷ 2 = 53

Smaller number = (Sum − Difference) ÷ 2 = (90 − 16) ÷ 2 = 74 ÷ 2 = 37
Verification: 53 + 37 = 90 and 53 − 37 = 16.
Therefore The correct answer is 53, 37.
Alternate Method
Given:
Sum of two numbers = 90
Difference between numbers = 16
Let the two numbers be x and y, where x > y.
=> x + y = 90 — (Equation 1)
=> x − y = 16 — (Equation 2)
Adding Equation 1 and Equation 2:
=> (x + y) + (x − y) = 90 + 16
=> 2x = 106
=> x = 106 ÷ 2 = 53
Substitute the value of x in Equation 1:
=> 53 + y = 90
=> y = 90 − 53
=> y = 37
Therefore The correct answer is 53, 37.
Additional Information
Linear Equations in Two Variables
When two variables are related by two linear conditions, they can be solved using Elimination or Substitution methods.
Sum and Difference Formula
If A + B = S and A − B = D, then the larger value A = (S + D) ÷ 2 and the smaller value B = (S − D) ÷ 2.
Verification Rule
Always verify the results by putting the values back into the original sum and difference conditions to ensure accuracy.

Q22. Answer: (c) 32.8 km

Shortcut Trick
Speed = 82 km/hr, Time = 24 min = 24/60 hr = 0.4 hr
Distance = 82 × 0.4 = 32.8 km
Therefore The correct answer is 32.8 km.
Alternate Method
Given:
Average Speed of the train = 82 km/hr
Time duration = 24 minutes
Formula Used:
Distance = Speed × Time
Calculations:
=> Convert Time from minutes to hours: 24 ÷ 60 hours
=> Time = 2/5 hours
=> Distance = 82 × (2/5)
=> Distance = 164 ÷ 5
=> Distance = 32.8 km
Therefore The correct answer is 32.8 km.
Additional Information
Unit Conversion
To convert km/hr to m/s, multiply by 5/18. To convert m/s to km/hr, multiply by 18/5.
Average Speed
Average Speed = Total Distance ÷ Total Time. For two equal distances with speeds x and y, Average Speed = 2xy/(x+y).
Relative Speed
Same direction: subtract speeds (s1 − s2). Opposite direction: add speeds (s1 + s2).

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Q23. Answer: (d) 329 ml

Shortcut Trick

If sugar is 6%, then water must be 100% − 6% = 94%.

Water volume = 94% of 350 ml.

=> 350 − (6% of 350) = 350 − 21 = 329 ml.

Therefore The correct answer is 329 ml.

Alternate Method

Given: Total volume = 350 ml, Sugar concentration = 6%.

Formula Used: Volume of Component = Total Volume × Percentage Concentration.

=> Sugar volume = (6 ÷ 100) × 350

=> Sugar volume = 0.06 × 350 = 21 ml

=> Water volume = Total volume − Sugar volume

=> Water volume = 350 − 21 = 329 ml

Therefore The correct answer is 329 ml.

Additional Information

Percentage Composition

The sum of percentages of all components in a mixture or solution is always 100%.

Dilution Formula

When more solvent (water) is added, the amount of solute (sugar) remains constant: C1V1 = C2V2.

Concentration by Mass/Volume

Concentration % = (Mass or Volume of Solute ÷ Total Volume of Solution) × 100.

Q24. Answer: (a) 1.25 Ω

CONCEPT:

• Resistance (R): The resistance offered to the flow of current is known as the resistance.

• SI unit of resistance is the ohm (Ω).

• Mathematically resistance can be written as

=> R = (ρ l)/A

Where R = resistance, l = length, A = area of cross-section and ρ = resistivity

EXPLANATION:

• That wire is doubled on it means to fold the length of wire. That is its length will get half and the area of the cross-section will get doubled.

Given: R1 = R = 5 Ω

As we know that the resistance of the wire is,

=> R = (ρ l)/A

When the wire is doubled then, then its area will increase automatically. But the volume of the wire will be the same.

Therefore The volume of original wire = volume of new wire

=> A1l1 = A2l2

=> A1l1 = A2 l1/2

=> A2 = 2A1

• The resistance of the wire in 1st case

=> R1 = R = (ρ l1)/A1 ----(1)

• The resistance of the wire in 2nd case

=> R2 = (ρ l2)/A2 = (ρ l1/2)/2A1 = (ρ l1)/4A1 -----(2)

Divide equation 1 and 2, we get

=> R/R2 = ((ρ l1)/A1)/((ρ l1)/4A1) = 4

=> R2 = 5/4 Ω = 1.25 Ω

Q25. Answer: (a) The weight of a body in an elevator moving downwards decreases while its Mass remains the same.

The correct answer is The weight of a body in an elevator moving downwards decreases while its Mass remains the same.

Key Points

• This force exerted by the scale is known as apparent weight.

• When the lift accelerates and decelerates the force that the cables and motors exert on the lift is either added to or subtracted from, the force with which the floor of the lift pushes up on you.
• This is what makes the body feel heavier and lighter.
• Consider the normal force (N) acting on the body (mass = m) from the elevator:
• If the elevator is at rest or moving at a constant velocity.
• N = mg
• If the elevator has an upward acceleration (a).
• N = mg + ma
• If the elevator has a downward acceleration (a).
• N = mg - ma
• When a lift accelerates downwards at the same rate as gravity (9.81 m/s²) the body would feel weightless.
• When a lift accelerates upwards at the same rate as gravity (9.81 m/s²) the body would feel twice weighed as much.

Q26. Answer: (b) 60

The pattern followed here is:

This is an alternating series of multiplication and addition. First number is multiplied by 2 to get the second number and then 2 is added to the second number to get the third number and so on.

Hence, “60” is the correct answer.

Q27. Answer: (a) Only assumption I is implicit

It is clear from the statement that Co-curricular activities are important to children.

Assumption I: “Holistic development occurs through various co-curricular activities” is implicit.

Assumption II: “Schools don’t admit without co-curricular activities” is irrelevant.

Hence, “Only assumption I is implicit” is the correct answer.

Q28. Answer: (d) 8/21

CONCEPT:

Here we need to make the denominators same by taking LCM so that we can compare to find the greatest fraction.

CALCULATION:

LCM of 14, 77, 66, 21 = 462

5/14 can be written as (5 × 33)/(14 × 33) = 165/462

29/77 can be written as (29 × 6)/(77 × 6) = 174/462

25/66 can be written as (25 × 7)/(66 × 7) = 175/462

8/21 can be written as (8 × 22)/(21 × 22) = 176/462

Comparing these we know that 8/21 is the greatest

Therefore 8/21 is the greatest fraction.

Q29. Answer: (c) positive

The correct answer is positive.

Key Points

• The distance from the lens to the focal point is called the focal length.
• For diverging or convex mirrors, the focal length is always positive.
• For a converging or concave mirror, the focal length is always negative.
• The focal length of a convex mirror is half of its radius of curvature.

Important Points

• The definitions of the principal axis, center of curvature C, the radius of curvature R, and the vertex V, of a convex mirror, are analogous to the corresponding definitions for a concave mirror.
• When parallel light-rays strike a convex mirror they are reflected such that they appear to emanate from a single point F located behind the mirror, as shown in fig below.
• This point is called the virtual focus of the mirror. The focal length f of the mirror is simply the distance between V and F. In the paraxial approximation, the focal length of a convex mirror is half of its radius of curvature.
• The power of an optical element is calculated by 1/focal length and the unit is dioptre (1/m).

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Q30. Answer: (b) 6

Shortcut Trick

Use the direct formula for two pipes: Time = (X × Y) ÷ (X + Y)

X = 10 hrs, Y = 15 hrs

Time = (10 × 15) ÷ (10 + 15) = 150 ÷ 25 = 6 hrs

Therefore The correct answer is 6 hrs.

Alternate Method

Given:

Time taken by Pipe A = 10 hrs

Time taken by Pipe B = 15 hrs

Formula Used:

Total Work = LCM of individual times

Efficiency = Total Work ÷ Time

Person	Days	Total Work	Efficiency
Pipe A	10	30	3
Pipe B	15	2	

Calculations:

=> Combined Efficiency of A + B = 3 + 2 = 5 units/hr

=> Total Time taken together = Total Work ÷ Combined Efficiency

=> Time = 30 ÷ 5

=> Time = 6 hrs

Therefore The correct answer is 6 hrs.

Additional Information

Pipes and Cisterns

If an inlet pipe fills in X hours and an outlet pipe empties in Y hours, the net work done in 1 hour is (1/X − 1/Y).

Efficiency Relation

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

Q31. Answer: (d) 3/8

CONCEPT:

Here we need to make the denominators same by taking LCM so that we can compare to find the smallest fraction.

CALCULATION:

LCM of (9, 4, 8 7) = 504

4/9 can be written as (4 × 56)/(9 × 56) = 224/504

5/4 can be written as (5 × 126)/(4 × 126) = 630/504

3/8 can be written as (3 × 63)/(8 × 63) = 189/504

6/7 can be written as (6 × 72)/(7 × 72) = 432/504

Therefore 3/8 is the smallest fraction

Q32. Answer: (c) tan (x + y) = - tan7

Shortcut Trick

For Inverse Trigonometric Functions, find the value in the principal range.

Since 4 radians is in Quadrant III ($\pi < 4 < 3\pi/2$), $x = \cos^{-1}(\cos 4) = 2\pi - 4$.

Since 3 radians is in Quadrant II ($\pi/2 < 3 < \pi$), $y = \sin^{-1}(\sin 3) = \pi - 3$.

Sum: $x + y = (2\pi - 4) + (\pi - 3) = 3\pi - 7$.

Taking tan: $\tan(x + y) = \tan(3\pi - 7) = \tan(-7) = -\tan 7$.

Therefore The correct answer is tan (x + y) = − tan 7.

Alternate Method

Given: $x = \cos^{-1}(\cos 4)$ and $y = \sin^{-1}(\sin 3)$.

Formula Used: $\cos^{-1}(\cos \theta) = 2n\pi \pm \theta$ and $\sin^{-1}(\sin \theta) = n\pi + (-1)n\theta$, such that the result lies in the Principal Value Branch.

=> For $x = \cos^{-1}(\cos 4)$, since 4 in $(\pi, 2\pi)$, we use $2\pi - 4 \approx 6.28 - 4 = 2.28$ (lies in [0, 3.14]).

=> x = 2π − 4

=> For y = sin−1(sin 3), since 3 in (π/2, 3π/2), we use π − 3 ≈ 3.14 − 3 = 0.14 (lies in [−1.57, 1.57]).

=> y = π − 3

=> x + y = (2π − 4) + (π − 3) = 3π − 7

=> tan(x + y) = tan(3π − 7)

=> tan(x + y) = tan(π − 7) = −tan 7

Therefore The correct answer is tan (x + y) = − tan 7.

Additional Information

Principal Value Branch

For sin−1x, range is [−π/2, π/2]. For cos−1x, range is [0, π]. All input values must be mapped to these intervals.

Periodicity of Tangent

tan(θ) has a period of π, meaning tan(nπ + θ) = tan θ. Also, tan(−θ) = −tan θ.

Quadrant Rules

cos(2π − θ) = cos θ (Quadrant IV) and sin(π − θ) = sin θ (Quadrant II). These help in shifting values to the principal range.

Q33. Answer: (d) 6

Shortcut Trick

Use the direct identity: $2xy = (x^2 + y^2) - (x - y)^2$

$2xy = 156 - 12^2$

$2xy = 156 - 144 = 12$

$xy = 12 \div 2 = 6$

Therefore The correct answer is 6.

Alternate Method

Given:

$x^2 + y^2 = 156$

$x - y = 12$

Formula Used:

Using the algebraic identity: $(a - b)^2 = a^2 + b^2 - 2ab$

Calculations:

=> $(x - y)^2 = x^2 + y^2 - 2xy$

=> $(12)^2 = 156 - 2xy$

=> $144 = 156 - 2xy$

=> $2xy = 156 - 144$

=> $2xy = 12$

=> $xy = 12 \div 2$

=> $xy = 6$

Therefore The correct answer is 6.

Additional Information

Square of Sum Identity

The square of the sum of two numbers is given by $(x + y)^2 = x^2 + y^2 + 2xy$.

Difference of Squares

The difference between the squares of two numbers is factorized as $x^2 - y^2 = (x - y)(x + y)$.

Relation between (x+y) and (x-y)

The two identities are related as $(x + y)^2 = (x - y)^2 + 4xy$.

Q34. Answer: (c) North – East

Therefore Y is facing the North-east direction.

So, “North-East” is the correct answer.

Q35. Answer: (d) Janata Party

The correct answer is Janata Party.

Key Points

• On June 25 in 1975, former Prime Minister of India, Indira Gandhi, took the most controversial decision and imposed an

Emergency across the country.

• The Emergency remained intact for 21 months and changed the dynamics of the country's political system.

• The Emergency was imposed on 25 June 1975, its foundation was laid on June 12 that year.

• After the national emergency was imposed, political leaders of opposition parties including Lal Krishna Advani, Atal Bihari Vajpayee, Morarji Desai, and Jayaprakash Narayan were sent to jail.

• On March 21, 1977, the Emergency ended.

• The Janata Party and its allies came to power at the center by defeating Congress Party in 1977.

• Janata Party and its allies won 330 out of 542 seats in the Lok Sabha. Janata Party itself won 295 seats.

Additional Information

• Railway Strike of 1974 was led by George Fernandes. Its main demand was related to bonuses and service conditions.

• The magazines like 'Seminar' and 'Mainstream' chose to close down after the declaration of emergency in 1975.

Q36. Answer: (c) Kangaroos

The correct answer is Kangaroos.

Key Points

• Kangaroos give birth to poorly developed young ones.

• Kangaroos are called marsupials.

• They Terrifically grow their babies, Kangaroos babies were very tiny when they gave birth.

• They were staying inside the mother's pouch until they have grown up for about 9 months.

• They can stay for three months in the pouch, after three months they can start to out their head from the pouch.

Q37. Answer: (a) Jammu and Kashmir

The correct answer is Jammu and Kashmir.

Key Points

• Dachigam National Park is located in Jammu and Kashmir.

• The park is best known as the home of the hangul, or Kashmir stag.

• 'Dachigam' means "Ten Villages", which stands for the number of villages that were relocated to facilitate its creation.

• Dachigam was declared a National Park in 1981.

Important Points

STATE	NATIONAL PARKS
Jammu and Kashmir	Salim Ali National Park, Kishtwar National Park
Kerala	Eravikulam National Park, Periyar National Park, Anamudi Shola National Park, Silent Valley National Park
Sikkim	Khangchendzonga National Park
Uttarakhand	Gangotri National Park, Jim Corbett National Park, Nanda Devi National Park, Rajaji National Park, Valley of Flowers National Park.

Q38. Answer: (c) 36.5

Shortcut Trick

Using the Assumed Mean Method, let the assumed mean (A) = 35 and class width (h) = 10.

The deviations (u_i) for the midpoints (15, 25, 35, 45, 55) are −2, −1, 0, 1, 2 respectively.

$\Sigma f_i u_i = (8 \times -2) + (12 \times -1) + (16 \times 0) + (11 \times 1) + (13 \times 2) = -16 - 12 + 0 + 11 + 26 = 9$.

Mean = $A + (\Sigma f_i u_i \div \Sigma f_i) \times h = 35 + (9 \div 60) \times 10 = 35 + 1.5 = 36.5$.

Therefore The correct answer is 36.5.

Alternate Method

Given:

The frequency distribution of the given class intervals.

Formula Used:

Mean = $\Sigma(f_i \times x_i) \div \Sigma f_i$

where x_i is the midpoint of each class interval and f_i is the corresponding frequency.

Calculations:

Find the midpoints (x_i) of each class interval:

=> For 10 - 20: $x_1 = (10 + 20) \div 2 = 15$

=> For 20 - 30: $x_2 = (20 + 30) \div 2 = 25$

=> For 30 - 40: $x_3 = (30 + 40) \div 2 = 35$

=> For 40 - 50: $x_4 = (40 + 50) \div 2 = 45$

=> For 50 - 60: $x_5 = (50 + 60) \div 2 = 55$

Calculate the product of frequency and midpoint ($f_i \times x_i$):

=> $f_1 \times x_1 = 8 \times 15 = 120$

=> $f_2 \times x_2 = 12 \times 25 = 300$

=> $f_3 \times x_3 = 16 \times 35 = 560$

=> $f_4 \times x_4 = 11 \times 45 = 495$

=> $f_5 \times x_5 = 13 \times 55 = 715$

Calculate the sum of frequencies (Σf_i) and sum of products ($\Sigma f_i x_i$):

=> $\Sigma f_i = 8 + 12 + 16 + 11 + 13 = 60$

=> $\Sigma f_i x_i = 120 + 300 + 560 + 495 + 715 = 2190$

Calculate the mean:

=> Mean = $\Sigma f_i x_i \div \Sigma f_i = 2190 \div 60 = 36.5$

Why other options are incorrect:

=> Option (1) 12 is incorrect because it lies at the extreme lower end of the first interval and does not represent the central tendency of the dataset.

=> Option (2) 23.4 is incorrect because the higher frequencies are concentrated in the 30-60 range, pulling the mean significantly higher than 23.4.

=> Option (4) 42.7 is incorrect because it is higher than the actual weighted average of 36.5.

Therefore The correct answer is 36.5.

Additional Information

Direct Method for Grouped Mean

The standard formula is Mean = $\Sigma f_i x_i \div \Sigma f_i$, where x_i is the class mark (midpoint) of the i-th class interval.

Assumed Mean Method

Used to simplify calculations: Mean = $A + \Sigma f_i d_i \div \Sigma f_i$, where A is the assumed mean and $d_i = x_i - A$ is the deviation.

Step-Deviation Method

Further simplifies calculations when class widths are equal: Mean = $A + h \times (\Sigma f_i u_i \div \Sigma f_i)$, where $u_i = (x_i - A) \div h$ and h is the class width.

Q39. Answer: (a) Deepika Kumari

The correct answer is Deepika Kumari.

Key Points

• Indian archer Deepika Kumari as a documentary on her life, Ladies First was released on Netflix.
• The documentary was directed by Uraaz Bahl and produced by his wife Shaana Levy-Bahl.
• Deepika is the daughter of Shivnarayan Mahato and Geeta Mahato.
• Shivnarayan is an auto-rickshaw driver while Geeta is a nurse at Ranchi medical college.
• She won her first World Cup individual stage recurve gold medal in May 2012.
• She won two gold medals in the Commonwealth Games in Delhi in 2010.

Important Points

• Rahul Banerjee is an Indian Olympic archer.
• He won a team silver medal, which was the first world-level medal for Indian archers.
• At the 2010 Commonwealth Games in Delhi, he won a gold medal.
• He won a team bronze at the 2010 Asian Games.
• Tarundeep Rai is an Indian archer.
• He has already represented the country at two Olympic Games - Athens 2004 and London 2012.
• Jayanta Talukdar is an Indian archer.
• He won the silver medal at the 2004 Junior World Championships.
• In 2006 he also won a gold medal at the South Asian Games.

Q40. Answer: (d) 4 years, 4 months

Shortcut Trick

Use the direct formula for Time (T) = (SI × 100) ÷ (P × R)

T = (390 × 100) ÷ (1800 × 5) = 390 ÷ 90 years

T = 13 ÷ 3 = 4 (1/3) years

T = 4 years + (1/3 × 12) months = 4 years 4 months.

Therefore The correct answer is 4 years, 4 months.

Alternate Method

Given:

Principal (P) = Rs. 1,800

Simple Interest (SI) = Rs. 390

Rate (R) = 5% per annum

Formula Used:

Simple Interest (SI) = (P × R × T) ÷ 100

Calculations:

=> 390 = (1800 × 5 × T) ÷ 100

=> 390 = 18 × 5 × T

=> 390 = 90 × T

=> T = 390 ÷ 90 = 39/9 years

=> T = 4 (3/9) years = 4 (1/3) years

=> T = 4 years + (1/3 × 12) months = 4 years 4 months

Therefore The correct answer is 4 years, 4 months.

Additional Information

Amount in Simple Interest

The total sum payable at the end of the period is the Amount (A), calculated as A = P + SI = P(1 + RT/100).

Rate of Interest Formula

To find the annual rate of interest: R = (SI × 100) ÷ (P × T).

Principal Formula

To find the initial sum invested: P = (SI × 100) ÷ (R × T).

Q41. Answer: (d) Density of the fluid and the volume of the body immersed in it

The correct answer is the Density of the fluid and the volume of the body immersed in it.

Key Points

• The buoyant force depends on the volume of the liquid displaced. The buoyant force depends on the mass of the object, the weight of the object, and its density.

• The buoyant force depends directly upon:

• The volume of the fluid displaced.

• The density of the fluid in which the body is immersed.

• Acceleration due to gravity at the place.

Important Points

• The three types of buoyancy are positive buoyancy, negative buoyancy, and neutral buoyancy.

• Positive buoyancy is when the immersed object is lighter than the fluid displaced and this is the reason why the object floats.

• Negative buoyancy is when the immersed object is denser than the fluid displaced which results in the sinking of the object.

• Neutral buoyancy takes place when the weight of an immersed object is equal to the fluid displaced.

Q42. Answer: (a) 3 hours, 26 minutes

Shortcut Trick

Net efficiency = 1/4 + 1/6 − 1/8

LCM of 4, 6, 8 = 24. Efficiencies: A = 6, B = 4, C = −3.

Combined efficiency = 6 + 4 − 3 = 7 units/hr.

Time = 24 ÷ 7 = 3.428 hours ≈ 3 hours 26 minutes.

Therefore The correct answer is 3 hr, 26 min.

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Alternate Method

Given: Filling time Tap A = 4 hrs, Tap B = 6 hrs. Emptying time Tap C = 8 hrs.

Formula Used: Total Work = LCM of individual times; Efficiency = Total Work ÷ Time.

Person	Days	Total Work	Efficiency
Tap A	4 hr	24 units	6
Tap B	6 hr	4	
Tap C	8 hr	−3	

=> Total Efficiency when all open = 6 + 4 − 3 = 7 units/hr

=> Time taken = 24 ÷ 7 hours

=> Time = 3 3⁄7 hours

=> Time = 3 hr + (3/7 × 60) min ≈ 3 hr + 25.7 min ≈ 3 hr 26 min

Therefore The correct answer is 3 hr, 26 min.

Additional Information

Pipes and Cisterns Convention

Inlet pipes have positive efficiency (work to fill), whereas outlet/leak pipes have negative efficiency (work to empty).

Total Time Formula

If two pipes fill in x and y hours and one empties in z hours, Net Work in 1 hour = (1/x + 1/y − 1/z).

Work and Wages

Wages are distributed in the direct ratio of efficiency or work done by each pipe/tap if they work for the same duration.

Q43. Answer: (b) Neutrons

The Correct Answer is Option 2 i.e Neutrons.

• The atom is composed of the proton, the neutron, and the electron.

• Protons and neutrons make up the nucleus of the atom, whereas the negatively charged electrons revolve around the nucleus.

• The number of protons found in the nucleus equals the number of electrons that surround it

• Protons and neutrons have nearly equal masses, but they differ in charge.

• Protons:

• The number of protons within the nucleus of a given atom is equal to the atomic number of the corresponding element.

• For example, the atomic number of helium is two. Therefore, the number of protons is also two.

• Neutrons:

• The number of neutrons within the nucleus of a given atom can be found by subtracting the atomic number from the atomic mass i.e difference between the mass number of the atom and the atomic number.

• The mass number is equal to the sum of protons and neutrons in an atom.

• Example Sodium, Na has Atomic Number is 11 and the Mass number is 23.

• So Protons are 11, Neutrons are 12, and electrons are 11.

Q44. Answer: (b) 134

The pattern followed here is:

4 + 13 × 1 = 17

17 + 13 × 2 = 43

43 + 13 × 3 = 82

82 + 13 × 4 = 134

Hence, “134” is the correct answer.

Q45. Answer: (d) Rhizopus

The correct answer is Rhizopus.

Key Points

• Spore formation is a method of asexual reproduction.

• Plants like ferns, moss, fungi reproduce by this method.

• Spores are unicellular reproductive bodies present in a sac called sporangia.

• Rhizopus is a saprophytic fungus and grows on substrates like bread, jelly, leather, decaying vegetables, and fruits.

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• It is commonly called ‘Bread mold’.

Important Points

Planaria	**• Planarian flatworms are well known for their amazing regenerative capacity that live in freshwater. - It depends on the presence of stem cells called neoblasts.**
Bryophyllum	• Bryophyllum pinnatum is used in ethnomedicine for the treatment of earache, burns, abscesses, ulcers, insect bites, diarrhea, and Lithiasis.
Hydra	• Hydra, a genus of invertebrate freshwater animals of the class Hydrozoa. - Hydra remains stationary for long periods, although they may move by bending the body, attaching with the tentacles, releasing the basal disc, and re-attaching. - In hydra, the medusa stage is absent and polyps reproduce both sexually and asexually.

Q46. Answer: (b) 0.81

CONCEPT:

Here we need to use BODMAS, firstly divide, then multiply and then add and lastly subtract.

CALCULATION:

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

Step-1: Parts of an equation enclosed in 'Brackets' must be solved first, and in the bracket,

Step-2: Any mathematical 'Of' or 'Exponent' must be solved next,

Step-3: Next, the parts of the equation that contain 'Division' and 'Multiplication' are calculated,

Step-4: Last but not least, the parts of the equation that contain 'Addition' and 'Subtraction' should be calculated.

Now,

$8.53 + 6.6 \times 0.8 - 1.17 \div 0.09$

$\Rightarrow 8.53 + 6.6 \times 0.8 – (1.17/0.09)$

$\Rightarrow 8.53 + 5.28 – 13$

Therefore $13.81 – 13 = 0.81$

Q47. Answer: (a) D

1) In figure A white area is on the left side of both the shapes and black area is on the right side of both the shapes.

2) In figure B white area is on the right side of both the shapes and black area is on the left side of both the shapes.

3) In figure C white area is on the bottom side of both the shapes and black area is on the top side of both the shapes.

4) In figure D white area in both shapes is on different side (in circle white area is on top side and in rectangle white area is in bottom side) and black area in both shapes is also on different side (in circle black area is on bottom side and in rectangle black area is in top side).

So Figure D is the odd one out.

Hence, “Figure D” is the correct answer.

Q48. Answer: (b) 1/200

Total Seconds in a day = 86400

Total seconds in 7 minutes 12 seconds = 420 + 12 = 432

fraction of a day are 7 minutes 12 seconds = 432/86400 = 1/200

Hence, 1/200 is the correct answer.

Q49. Answer: (d) Data in II alone is sufficient

Age order according to given question:

Beena > Meena

Kavi > Swathi

Statement I:

“Swathi is younger than Beena” (i.e Beena > Swathi)

There are two possibilities of the age order according to this statement:

1) Beena > Meena > Kavi > Swathi

2) Beena > Kavi > Swathi > Meena

So, “Statment I” is not sufficient to answer the question.

Statement II:

“Kavi is younger than Meena” (i.e Meena > Kavi)

There is only one possibility of the age order according to this statement:

Beena > Meena > Kavi > Swathi

So, Swathi is the youngest.

Therefore Data in Statement II alone is sufficient to answer the given question.

Hence, “Data in II alone is sufficient” is the correct answer.

Q50. Answer: (a) A

The pattern here is as follows:

Similarly,

Hence, “Diagram D” is the correct answer.

Q51. Answer: (c) Only conclusion 2 follows

From the given statements we can draw the least possible Venn diagram for the given question and answer the conclusions according to Venn diagram:

Conclusion 1: “All rats are cats”.

It is possible but not definite. Hence, conclusion “All rats are cats” is false.

Conclusion 2: “Some of the tigers are rats”.

As some tiger are cats and all cats are rats.

So, the conclusion “Some of the tigers are rats” is true.

Hence, “Only conclusion 2 follows” is the correct answer.

Q52. Answer: (a) Evolution

The correct answer is Evolution.

Key Points

• Evolution in its contemporary meaning in biology typically refers to the changes in the proportions of biological types in a population over time.

• Evolution is the change in the characteristics of a species over several generations and relies on the process of natural selection.

• Evolution relies on there being genetic variation? in a population which affects the physical characteristics (phenotype) of an organism.

• Charles Darwin is usually the starting point for contemporary understandings of evolution.

• Charles Darwin’s theory of evolution states that evolution happens through natural selection.

• Individuals in a species show variation in physical characteristics.

• This variation is because of differences in their genes.

Important Points

Fossils	**• They are the geologically altered remains of a once-living organism and/or its behavior. - There are two main types: body fossils represent all or part of the organism’s body, and trace fossils show evidence of the organism’s behavior. - The study of fossils is called paleontology.**
Analogous organs	• They are the opposite of homologous organs, which have similar functions but different origins. - An example of an analogous trait would be the wings of insects, bats, and birds that evolved independently in each lineage separately after diverging from an ancestor without wings.
Homologous organs	• Homologous organs are organs that have a common origin and ancestor but have evolved to perform different functions. - Example: The wings of bird and bat, flipper (fin) of a whale, structure of human forearm have common ancestors but perform a different function.

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Q53. Answer: (c) Rs. 4160

Shortcut Trick

Efficiency Ratio is the inverse of Time Ratio when work is constant.

Ratio of time (A : B) = 5 : 8 → Ratio of efficiency (A : B) = 8 : 5

Total ratio parts = 8 + 5 = 13 units → Rs. 6760

A's share = (8 ÷ 13) × 6760 = 8 × 520 = Rs. 4160

Therefore The correct answer is Rs. 4160.

Alternate Method

Given: Time taken by A = 5 days, Time taken by B = 8 days, Total Wages = Rs. 6760.

Formula Used: Wages are distributed in the ratio of Efficiency when people work for the same duration. Efficiency = Total Work ÷ Time.

Person	Days	Total Work	Efficiency
A	5	40	8
B	8	5	

=> Ratio of efficiency of A : B = 8 : 5

=> Sum of ratios = 8 + 5 = 13

=> 13 units = Rs. 6760

=> 1 unit = 6760 ÷ 13 = Rs. 520

=> A's share = 8 units = 8 × 520

=> A's share = Rs. 4160

Therefore The correct answer is Rs. 4160.

Additional Information

Work and Wages Rule

Wages are directly proportional to the work done. If time is same for all, Wages prop. to Efficiency. If work is done for different durations, Wages prop. to (Efficiency × Time).

Pipes & Cisterns Wage Analogy

Similar to men working, the rate of flow (efficiency) of a pipe determines its contribution to the total volume filled/emptied.

Q54. Answer: (d) 1/√3

Shortcut Trick

Identify complementary angles: tan θ × tan (90° − θ) = 1.

Pairing: (tan 8° × tan 82°) = 1 and (tan 22° × tan 68°) = 1.

The expression simplifies to: 1 × 1 × cot 60°.

Value of cot 60° = 1/√3.

Therefore The correct answer is 1/√3.

Alternate Method

Given: tan 8° tan 22° cot 60° tan 68° tan 82°

Formula Used: tan (90° − θ) = cot θ and tan θ × cot θ = 1

=> Expression = tan 8° × tan 22° × cot 60° × tan (90° − 22°) × tan (90° − 8°)

=> Expression = tan 8° × tan 22° × cot 60° × cot 22° × cot 8°

=> Expression = (tan 8° × cot 8°) × (tan 22° × cot 22°) × cot 60°

=> Expression = 1 × 1 × (1/√3)

=> Expression = 1/√3

Therefore The correct answer is 1/√3.

Additional Information

Complementary Angle Identities

For any angle θ, sin (90° − θ) = cos θ, tan (90° − θ) = cot θ, and sec (90° − θ) = cosec θ.

Standard Trigonometric Values

tan 30° = 1/√3, tan 45° = 1, tan 60° = √3. Note that cot θ = 1/tan θ, so cot 60° = 1/tan 60° = 1/√3.

Product Rule for Tangents

If A + B = 90°, then tan A × tan B = 1 and cot A × cot B = 1.

Q55. Answer: (c) Shivangi Pathak

The correct answer is Shivangi Pathak.

• India's Shivangi Pathak has become the youngest woman in the country to scale Mt Everest from the Nepal side.

• She was 16 years old when she got this achievement.

Important Points

Deepika Rathore	**• She is an ex-NCC cadet from Rajasthan. - She achieved her second Mount Everest summiting. - Her first achievement was in 2012.**
Premlata Agarwal	• She is the Indian mountaineer. - She is the first Indian woman to have climbed the Seven Summits or the seven highest peaks of the world. - She is the winner of the Tenzing Norgay National Adventure Award.
Bachendri Pal	• She is the first Indian woman to reach the summit of Mount Everest in 1984. - "EVEREST MY JOURNEY TO THE TOP" book written by Bachendri Pal.

Additional Information

• Raghav Joneja from Moradabad became the youngest Indian to scale Mount Everest when he along with his five schoolmates climbed the first highest peak in the world.

• He set his record at age of 15 years and 7 months.

Q56. Answer: (d) Lead and tin

The correct answer is Lead and tin.

• Solder is a metal alloy usually made of tin (60%) and lead (40%) which is melted using a hot iron.

• Soldering is a joining process used to join different types of metals together by melting solder.

Important Points

• List of Important Alloys and their Uses:

ALLOY	COMPOSITIONS	USES
Brass	Cu + Zn	Making of utensils.
Bronze	Cu + Sn	Making of coins, bell, and utensils.
German Silver	Cu + Zn + Ni	Making of utensils
Gun Metal	Cu + Sn + Zn + Pb	Making of guns, barrels, gears, and bearings.
Stainless steel	Fe + Cr + Ni + C	Making of utensils and surgical cutlery.
Nickel steel	Fe + Ni	Making of electrical wire, automobile parts.

Q57. Answer: (a) Rs. 12,500

Shortcut Trick

Use the chain rule for successive profits: Initial CP × (100 + P1)% × (100 + P2)% = Final Price.

Let the cost price for M be x.

x × (110 ÷ 100) × (104 ÷ 100) = 14,300.

x × 1.1 × 1.04 = 14,300 => x × 1.144 = 14,300.

x = 14,300 ÷ 1.144 = 12,500.

Therefore The correct answer is Rs. 12,500.

Alternate Method

Given: Profit of M = 10%, Profit of N = 4%, Price paid by P = Rs. 14,300.

Formulas: SP = CP × (100 + P%) ÷ 100

=> Let CP of M = Rs. x.

=> Selling Price of M (which is CP for N) = x × (110 ÷ 100) = 1.1x.

=> Selling Price of N (which is CP for P) = 1.1x × (104 ÷ 100) = 1.144x.

=> According to the question: 1.144x = 14,300.

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=> x = 14,300 ÷ 1.144.

=> x = 12,500.

Therefore The correct answer is Rs. 12,500.

Additional Information

Successive Percentage Change

When a value is changed by a% and then b%, the net effective change is given by (a + b + ab ÷ 100)%.

Cost Price vs Selling Price

The Selling Price for the first person becomes the Cost Price for the next person in a chain of transactions.

Q58. Answer: (c) Only conclusion 1 follows

From the given statements we can draw the least possible Venn diagram for the given question and answer the conclusions according to the Venn diagram:

Conclusion 1: “Some bulbs are lamps” (True)

As some bulbs are lights and all lights are lamps.

So, the conclusion “Some bulbs are lamps” is true.

Conclusion 2: “No light is a bulb”.

It is not possible as some bulbs are lights. Hence, conclusion “No light is a bulb” is false.

Hence, “only conclusion 1 follows” is the correct answer.

Q59. Answer: (c) D

In the figure A, B, C there is a similarity that embedded figure is same as the outer figure.

But in figure D, the embedded figure is not same as the outer figure. Figure D is the odd one out.

Hence, “Figure D” is the correct answer.

Q60. Answer: (b) 5% profit

Shortcut Trick

CP = 100% | Given loss = 7% => SP1 = 93%

93% ≡ Rs. 31 => 1% ≡ 31 ÷ 93 = 1/3

SP2 = Rs. 35 => Percentage value = 35 × 3 = 105%

Profit% = 105% − 100% = 5%

Therefore The correct answer is 5% profit.

Alternate Method

Given: SP1 = Rs. 31, Loss% = 7%, SP2 = Rs. 35

Formulas: CP = [SP × 100] ÷ [100 − Loss%], Profit% = [(SP − CP) ÷ CP] × 100

=> Cost Price (CP) = (31 × 100) ÷ (100 − 7) = 3100 ÷ 93 = Rs. 100/3

=> New Selling Price (SP2) = Rs. 35

=> Profit = 35 − 100/3 = (105 − 100) ÷ 3 = Rs. 5/3

=> Profit% = [(5/3) ÷ (100/3)] × 100 = (5 ÷ 100) × 100 = 5%

Therefore The correct answer is 5% profit.

Additional Information

Cost Price and Outlay

The term outlay refers to the total Cost Price (CP) including any overhead expenses incurred on the article.

Relationship between SP and CP

If SP > CP, it is a Profit. If SP < CP, it is a Loss. Profit or Loss is always calculated on the CP unless stated otherwise.

Q61. Answer: (b) Agriculture & farmers

The correct answer is Agriculture & farmers.

Important Points

• Ministry of Agriculture funding start-ups under the innovation and agripreneurship component of Rashtriya Krishi Vikas Yojana in 2020-21.

• A component, Innovation and Agri-entrepreneurship Development program has been launched under this program.

• These start-ups are in various categories such as:

• Agro-processing, artificial intelligence, digital agriculture, farm mechanization, waste to wealth, dairy, fisheries, etc.

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• The Cabinet has approved (1st November 2017) for the continuation of the ongoing Centrally Sponsored Scheme (State Plans) – Rashtriya Krishi Vikas Yojana (RKVY) as Rashtriya Krishi Vikas Yojana- Remunerative Approaches for Agriculture and Allied Sector Rejuvenation (RKVY-RAFTAAR).

• In the first phase, 112 startups in the area of agro-processing, food technology and value addition will be funded for a sum of Rs. 1185.90 lakhs.

• The Rashtriya Krishi Vikas Yojna (RKVY) which aims at strengthening infrastructure in agriculture and allied areas,

Q62. Answer: (c) Mukesh Ambani

The correct answer is Mukesh Ambani.

Key Points

• Reliance Industries Chairman Mukesh Ambani has topped the Forbes Global Game Changers list in 2017.

• The top 5 spots in the list have been occupied by:

1. Mukesh Ambani of India
2. Ziv Aviram, Amnon Shashua of Israel
3. Stewart Butterfield of United States
4. John and Patrick Collison of the United States
5. James Dyson of United Kingdom

Additional Information

• Kumar Mangalam Birla, the chairman of the Aditya Birla Group.

• He received the honour of 'The Ernst & Young Entrepreneur of the Year-India' in 2005.

Q63. Answer: (d) 19√2

Shortcut Trick

In an Arithmetic Progression (A.P.), the n^(th) term is calculated as: a + (n − 1)d.

Here, the first term (a) = √2 and the common difference (d) = 2√2.

For the 10^(th) term, we need to add 9 common differences to the first term.

Calculation: √2 + (9 × 2√2) = √2 + 18√2 = 19√2.

Therefore The correct answer is 19√2.

Alternate Method

Given:

Arithmetic Progression: √2, 3√2, 5√2, 7√2, ...

First term (a) = √2

Common difference (d) = 3√2 − √2 = 2√2

Term to find (n) = 10

Formula Used:

n^(th) term of A.P. (T_n) = a + (n − 1)d

Calculations:

=> T10 = √2 + (10 − 1) × (2√2)

=> T10 = √2 + 9 × 2√2

=> T10 = √2 + 18√2

=> T10 = 19√2

Therefore The correct answer is 19√2.

Additional Information

Arithmetic Progression (A.P.) General Term

The general term is T_n = a + (n − 1)d, where 'a' is the first term and 'd' is the common difference.

Common Difference

It is obtained by subtracting any term from its succeeding term: d = T2 − T1 = T3 − T2.

Sum of First n Terms

The sum S_n is given by (n/2)[2a + (n − 1)d] or (n/2)[a + l], where 'l' is the last term.

Q64. Answer: (d) Saturday

Number of odd days from 22 feburary 2002 to 22 feburary 2008 = 1 + 1 + 2 + 1 + 1 + 1 = 7 (0 odd day)

Number of odd days from 22 feburary 2008 to 15 march 2008 = 7 + 15 = 22 (1 odd day)

So total number of odd days from 22 feburary 2002 to 15 march 2008 = 1

So, the day on 15 march 2008 was “Saturday”.

Hence, “Saturday”is the correct answer.

CONCEPT:

A normal year has 365 days (i.e.) 52 weeks plus 1 odd day. When we proceed forward by one year, then 1 day is gained and vice-versa.

Leap years have 366 days. The extra day is added to February which has 29 days in a leap year.

When we proceed forward by one leap year, then 2 odd days are gained

A year is considered to be a leap year if:

a) The year can be evenly divided by 4.

b) If the year can be evenly divided by 100, it is NOT a leap year, unless;

c) The year is also evenly divisible by 400. Then it is a leap year

Number of odd days in each month in a normal year:

Jan	Feb	March	April	May	June	July	August	September	October	November	December
3	0	3	2	3	2	3	3	2	3	2	3

Number of odd days in each month in a leap year:

Jan	Feb	March	April	May	June	July	August	September	October	November	December
3	1	3	2	3	2	3	3	2	3	2	3

Q65. Answer: (b) A

DIAGRAM

So, “diagram A” is the correct answer.

Q66. Answer: (c) [figure]

The pattern is as follows:

Outer rectangle symbols are turned anticlockwise and placed in inner rectangle and inner rectangle symbols are turned clockwise and placed in the inner rectangle

Hence “Figure 3” is the correct answer.

Alternate MethodThe outer shape of the rectangle is placed in the inner rectangle, and the inner shape of the rectangle is placed in the outer rectangle:

Similarly,

Hence, the correct answer is "Option 3".

Q67. Answer: (d) Rs. 2.11 lakh crore

The correct answer is Rs. 2.11 lakh crore.

Key Points

• The Indian government announced an allocation of Rs 2.11 lakh crore over two years for the recapitalization of public sector banks.

• The deficit target of 3.2 percent of GDP for the year.

• The plan is intended to help banks make adequate provisions against bad loans and revive lending.

• It may help support a recovery in the economy and private investment.

• The recapitalization plan is split into two parts:

• Rs 1.35 lakh crore - will come via the issue of recapitalization bonds.

• Rs 76,000 crore, which includes Rs 18,000 crore allocated under the Indradanush Recapitalisation Scheme, will come through budgetary support over two fiscal years.

Q68. Answer: (c) Wednesday

Number of odd days from 17 January 2004 to 17 January 2013 = 2 + 1 + 1 + 1 + 2 + 1 + 1 + 1 +

2 = 12 (5 odd days)

Number of odd days from 17 January 2013 to 10 April 2013 = 14 + 0 + 3 + 10 = 27 (6 odd days)

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Number of odd days from 17 January 2004 to 10 April 2013 = 6 + 5 = 11 (4 odd days)

So, on 10 April 2013 will be Wednesday.

Hence, “Wednesday” is the correct answer.

CONCEPT:

A normal year has 365 days (i.e.) 52 weeks plus 1 odd day. When we proceed forward by one year, then 1 day is gained and vice-versa.

Leap years have 366 days. The extra day is added to February which has 29 days in a leap year.

When we proceed forward by one leap year, then 2 odd days are gained

A year is considered to be a leap year if:

a) The year can be evenly divided by 4.

b) If the year can be evenly divided by 100, it is NOT a leap year, unless;

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Number of odd days in each month in a normal year:

Jan	Feb	March	April	May	June	July	August	September	October	November	December
3	0	3	2	3	2	3	3	2	3	2	3

Number of odd days in each month in a leap year:

Jan	Feb	March	April	May	June	July	August	September	October	November	December
3	1	3	2	3	2	3	3	2	3	2	3

Q69. Answer: (a) The Conference of Asian Countries, New Delhi in 1947

The correct answer is The Conference of Asian Countries, New Delhi in 1947.

Key Points

• The Asian Games are the oldest and most prestigious event on the Olympic Council of Asia (OCA) calendar, dating back to the inaugural edition in 1951.

• The 2018 Asian Games in Jakarta and Palembang, Indonesia was the 18th edition.

• The flag bearer of this event from the Indian side was Javelin Thrower "Neeraj Chopra".

• The first edition of the Asian Games was held in New Delhi in March 1951.

• The hosted country of the 2022 Asian Games will be Hangzhou, China.

Important Points

• India stood second in the first Asian Games in 1951.

• The Asian Games had been held the most number of times in Bangkok - 4 times.

• Kamaljit Sandhu (Runner) is the first Indian woman to win a gold medal at the Asian Games.

Q70. Answer: (d) Only assumption I is implicit

It is clear from the statement that he want to become a school teacher.

Assumption 1: “I am not a school teacher” is implicit.

Assumption 2: “I am a school teacher” is false.

Hence, “Only assumption I is implicit”is the correct answer

Q71. Answer: (b) Abscisic acid

The correct answer is Abscisic acid.

Key Points

• The plant hormone, Abscisic acid inhibits the growth of the plant.

• Auxin, Gibberellins, and cytokinins promote the growth of the plant.

• Abscisic Acid (ABA) is involved in the closure of stomata, seeds dormancy, and inhibit other hormonal actions.

• It plays an important role in seed maturation.

• It also has an important role in the synthesis of proteins and compatible osmolytes, which enable plants to tolerate stresses due to environmental or biotic factors.

Additional Information

• Cytokinins, Gibberellins, Auxins are responsible for plant growth.

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• They are produced within the plant and occur in very low concentrations.
• They control all aspects of plant growth and development, regulation of organ size, embryogenesis, stress tolerance, etc.

Q72. Answer: (c) 4 mgh

The correct answer is 4 mgh.

Key Points

• Potential energy is the stored energy of position possessed by an object.
• Potential Energy (P_e) = m × g × h
• m represents the mass of the object.
• h represents the height of the object.
• g represents the gravitational field strength (9.8 N/kg on Earth).
• Here given height is 4h.

So the P_e of the object = m × g × 4h = 4 mgh.

Q73. Answer: (a) 11

Symbol	<	×
Meaning	•	÷

Thus, ([(25 < 15)] × 4) < 1 will be decoded as ([(25 + 15)] ÷ 4) + 1

Solving

([(25 + 15)] ÷ 4) + 1)

= ([(40)] ÷ 4) + 1

= (10) + 1

= 11

Hence, '11' is the correct answer.

Q74. Answer: (a) Methanoic acid

The correct answer is Methanoic acid.

• The acid present in an ant sting is Formic acid.
• Formic acid (systematically called methanoic acid) is the simplest carboxylic acid.
• Molecular formula: HCOOH
• It is quite fatal for those ants as after stinging, their stinger is lost and they forcibly release formic acid from their poison gland.

Important Points

• Oxalic acid is an organic compound found in many plants. These include leafy greens, vegetables, fruits, cocoa, nuts, and seeds
• Lactic acid is a natural organic acid, found in milk and other food products such as meat and beer.
• It is used in the food industry as a preservative, flavor enhancer, and acid adjustment.
• Citric acid is found naturally in citrus fruits, like lemons and limes.
• It gives them their tart, sour taste.

Q75. Answer: (d) TSTASU

In this coding each word is divided into various set of two alphabets and each set is reversed and then merged respectively.

Like "VISITORS" is divided into sets of VI, SI, TO, RS and each set is reversed IV, SI, OT, SR and then these sets are merged respectively IVSIOTSR.

Similarly, "STATUS" is divided into sets of ST, AT, US and each set is reversed TS, TA, SU and then these sets are merged respectively TSTASU.

Hence, "TSTASU" is the correct answer.

Q76. Answer: (a) OQNCTBSHNM

Each alphabet in second word is obtained by "alphabet position value in first word -1".

So the word "CREATION" is coded as:

Similarly the word "PRODUCTION" is coded as:

Hence, "OQNCTBSHNM" is the correct answer.

Q77. Answer: (b) 42

Difference between the consecutive terms,

=> 12 - 6 = 6

=> 20 - 12 = 8

=> 30 - 20 = 10

=> ? - 30 = 12

=> 56 - ? = 14

=> 72 - 56 = 16

Therefore ? = 12 + 30 = 42

Q78. Answer: (a) Meerut

The correct answer is Meerut.

Key Points

• With a daily earning of nearly Rs 10 crore, Meerut is the largest jewellery market in Uttar Pradesh and among the top ten in the country.

• With over 40,000 artisans and 2,000 jewelry shop owners in the city depending on the industry.

• The gems and jewelry sector plays a significant role in the Indian economy, contributing around 7% of the country's GDP and 15% to India's total merchandise export.

• India's gems and jewelry sector is one of the largest in the world, contributing 29% to global jewelry consumption.

• The sector is home to more than 300,000 gems and jewelry players.

• Its market size will grow by US$ 103.06 billion during 2019–2023.

Q79. Answer: (a) Group 18

The correct answer is Group 18.

Important Points

• The periodic table was first given by Mendeleev of 63 elements and defined as " physical and chemical properties of the elements are the periodic function of their atomic masses".

• After Mendeleev due to some demerits, a Modern Periodic table was given by Henry Moseley which is defined as "physical and chemical properties of elements are the periodic function of their atomic number".

• In the periodic table, vertical columns are called groups, and horizontal rows are called periods.

• In the periodic table, 18 groups and 7 periods are given and 118 elements discovered till now.

Key Points

• In the periodic table, group 18 called as Inert gases group or noble gases group because all elements are in a gaseous state of this group and all elements are stable in nature.

• It includes helium, neon, argon, krypton, xenon, and radon.

• The characterized of Noble gases are:

• Low reactivity

• Low boiling point

• Very low electronegativity

• High ionization energy

• Colourless and odourless

Q80. Answer: (a) 3

Shortcut Trick

Simplify both factors to the form (a − b) and (a + b).

First part: $3\sqrt{9} - 3\sqrt{8} = 9 - 6\sqrt{2}$

Second part: $9 + 2\sqrt{18} = 9 + 6\sqrt{2}$

Product inside the root: $(9 - 6\sqrt{2})(9 + 6\sqrt{2}) = 9^2 - (6\sqrt{2})^2 = 81 - 72 = 9$

The result is $\sqrt{9} = 3$.

Therefore The correct answer is 3.

Alternate Method

Given:

Expression: $\sqrt{((3\sqrt{9} - 3\sqrt{8})(9 + 2\sqrt{18}))}$

Formula Used:

1. $(a - b)(a + b) = a^2 - b^2$

2. $\sqrt{x^2} = x$

Calculations:

$\Rightarrow \sqrt{((3 \times 3 - 3 \times \sqrt{(4 \times 2)}) \times (9 + 2 \times \sqrt{(9 \times 2)}))}$

$\Rightarrow \sqrt{((9 - 3 \times 2\sqrt{2}) \times (9 + 2 \times 3\sqrt{2}))}$

$\Rightarrow \sqrt{((9 - 6\sqrt{2}) \times (9 + 6\sqrt{2}))}$

Using the algebraic identity $(a - b)(a + b)$ where $a = 9$ and $b = 6\sqrt{2}$:

$\Rightarrow \sqrt{(9^2 - (6\sqrt{2})^2)}$

$\Rightarrow \sqrt{(81 - 36 \times 2)}$

$\Rightarrow \sqrt{(81 - 72)}$

$\Rightarrow \sqrt{9}$

$\Rightarrow 3$

Therefore The correct answer is 3.

Additional Information

Algebraic Identities

The identity $(a - b)(a + b) = a^2 - b^2$ is used to simplify the product of conjugate surds.

Simplifying Surds

A surd $\sqrt{(m^2n)}$ can be simplified to $m\sqrt{n}$ by extracting the perfect square factor from the radicand.

Square Root Property

For any positive real number x, the principal square root $\sqrt{x}$ is always positive.

Q81. Answer: (d) Hindi Medium

The correct answer is Hindi Medium.

Key Points

• The Irfan khan and Saba Qamar starrer 'Hindi Medium' was named the best film at the 63rd edition of the Filmfare Awards.

• Irfan won the Best Actor award at the 63rd Jio Filmfare Awards 2018 for 'Hindi Medium' while

• Vidhya Balan won the Best Actress award at the 63rd Jio Filmfare Awards 2018 for 'Tumahri Sulu'.

Additional Information

• Toilet Ek Prem Katha was a movie directed by Shree Narayan Singh

• This film is Co-produced by Akshay Kumar and Neeraj Pandey, the film stars Akshay Kumar and Bhumi Pednekar in the lead roles.

• This film is a satirical comedy in support of governmental campaigns to improve sanitation conditions in India, with an emphasis on the eradication of open defecation, especially in rural areas.

• Rustom is a movie in which Akshay Kumar and Illeana D'Cruz in a leading role.

• Rajkumar Rao starrer 'Newton' won the Best Film (critics) Filmfare Award.

• This Movie has been selected as India's official entry to the Oscars.

Q82. Answer: (b) Affordable housing

The correct answer is Affordable housing.

Key Points

• Pradhan Mantri Awas Yojana (Urban) mission launched on 25th June 2015.

• Its aim is to provide housing for all in urban areas by the year 2022.

• The Yojana involves the construction of around 20 million houses at an affordable price by March 31, 2022.

• The Mission provides Central Assistance to the implementing agencies through States/ Union Territories (UTs) and central nodal agencies for providing houses to all eligible families/ beneficiaries against the validated demand for houses for about 1.12cr.

• As per PMAY(U) Guidelines, the size of the house for the Economically Weaker Section(EWS) could be up to 30 sq. mt. carpet area, States/UTs have the flexibility to enhance the size of houses in consultation and approval of the ministry.

• This is the government's effort towards the (PMAY)empowerment of women from EWS and LIG unlike earlier schemes, PMAY(U) has made a mandatory provision for the female head of the family to be the owner or co-owner of the house under this mission.

Q83. Answer: (d) 2 × 3^(19)

CONCEPT:

Here we need to take common and then calculate the square root.

FORMULAE USED:

(A^x)^y = A^(xy)

CALCULATION:

(3^(38) + 3³^9)^(1/2) = (3^(38) (1 + 3))^(1/2) = (3^(38) × 4)^(0.5) = 3^(19) × 2

Therefore The answer is 2 × 3^(19)

Q84. Answer: (a) Reflection

Key Points

• Reflection- When the light rays fall on the plane surface it deviates from its path in the same medium.

• or When a ray of light is incident on the plane surface is reflected back into the same medium it is termed as Reflection.

• Example - Plane Mirror.

Important Points

• The angle of incidence is the angle between a ray incident on a surface and the line perpendicular to the surface at the point of incidence, called the normal.

• Laws of reflection

• The angle of incidence is equal to the angle of reflection.

• The Normal, Incident ray, reflected ray lie on the same plane at the point of Incidence.

• Refractive Index- It is a value calculated from the ratio of the speed of light in a vacuum to that in a second medium of greater density.

• formula, n= c/v where n= refractive index, c= speed of light, v= phase velocity of a light.

Additional Information

• Refraction- When a light ray travels from one transparent medium to another transparent medium then it deviates from its original path and this phenomenon is called Refraction.

• For example- when light travels from the Rarer medium (Air) to the Denser medium (Water) is deviates towards the Normal.

• Laws of refraction

• The ratio of the sine of the angle of incidence to the sine of the angle of refraction is constant.

• The Normal, Incident ray, Refracted ray lie on the same plane at the point of Incidence.

Mistake Points

• For refraction-

• The Normal, Incident ray, Refracted ray lie on the same plane at the point of Incidence.

• For reflection

• The Normal, Incident ray, reflected ray lie on the same plane at the point of Incidence

Q85. Answer: (a) Arnab Goswami

The correct answer is Arnab Goswami.

Key Points

• Arnab Goswami is an Indian news anchor, who is the managing director and editor-in-chief of the Republic Media network.

• Goswami's Republic Media Network presently owns and operates two channels namely Republic TV in English and Republic Bharat in Hindi.

• The Estimated gross salary of Arnab Goswami is 12 crore.

• He is in the list of Top 6 highest paid anchors in India.

Additional Information

Ravish Kumar	**• He is an Indian Journalist, Author, and Media personality. - He is the Senior Executive Editor of NDTV India and awarded with Ramon Magsaysay Award. - He hosts a number of the channel's flagship weekday show Prime Time, Hum Log, Ravish Ki Report, and Des Ki Baat.**
Sonia Singh	• She is an Indian Television actress. - She is known for her role as Dr. Kirti Mehra in star one's Dil mil Gaye serial, Richa Thakral in Parichay, Sushma in Bhabhi, and Antara in KumKum. - She was nominated for ITA Award for Best (Female) Popular, ITA Award for Best Actress in Negative Role.

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Anjana Om Kashyap	• She is an Indian Journalist and anchor. - She is an executive editor of the Hindi news channel. Aaj Tak.

Q86. Answer: (d) sensation of sound

The correct answer is the Sensation of Sound.

Important Points

• Sound Waves enter the outer ear and travel through a narrow passageway called the ear canal, which leads to the eardrum.

• The eardrum vibrates from the incoming sound waves and sends these vibrations to three tiny bones in the middle ear.

• These bones are called Malleus, Incus, Stapes.

• The bones in the middle ear amplify, or increase the sound vibrations and send them to the cochlea, a snail-shaped structure filled with a fluid, in the inner ear.

• Once the sound reaches the inner ear sensory cells present in the ear produce a Sensation of sound to the ear.

Additional Information

• Loudness refers to how loud or soft a sound seems to a listener.

• The loudness of sound is determined, in turn, by the intensity, or amount of energy, in sound waves.

• The unit of sound is the decibel (dB).

• The unit of Frequency is called hertz (Hz).

• Humans with normal hearing can hear sounds between 20 Hz and 20 kHz. ". The human hearing range is called the audible range.

• Music- It is the ordered sound that gives pleasant sound to our ears and provides us harmony.

Q87. Answer: (a) 375 W

The correct answer is 375 W.

Key Points

The mass of a body is defined as the measure of the amount of matter in an object.

• Its S.I. Unit is Kg.

• Potential energy is defined as the energy possessed by a body in a state of rest. Its S.I. Unit is Joule.

• Power is defined as the rate of doing work. Its S.I.Unit is Watt.

• Acceleration due to gravity is represented by g. Its S.I.Unit is ms^(-2).

Calculation:

Given the mass of the body (m) = 50Kg.

height (h)= 45×15 = 675cm = 6.75m.

time (t)= 9 sec, g= 10ms^(-2).

Potential energy = mgh

= (50 × 10 × 6.75) J

= 3375 J.

• Power of the body = Rate of doing work = Energy / Time

= 3375 / 9

= 375 W.

So, the power is 375 W.

Q88. Answer: (b) Krishi Vikas Yojana

The correct answer is Krishi Vikas Yojana.

• Key Points

• The Saffron bowl is confined to Kashmir may soon expand to the North East of India.

• Plants from seeds transported from Kashmir to Sikkim and acclimatized there are now flowering in Yangyang in the southern part of the North-East state.

• Saffron production has long been restricted to a limited geographical area in the union territory of Jammu and Kashmir.

• The Pampore region in India is commonly known as the Saffron bowl of Kashmir.

• It is the main contributor to saffron production, followed by Budgam, Srinagar, and kishtiwar districts.

• National Saffron Mission focussed on several measures to improve its farming, the measures were still restricted to specified areas of Kashmir.

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• North East Centre For Technology Application and Reach (NECTAR) is an autonomous body under the Department of Science & Technology, under the Gov. of India supported a pilot project to explore the feasibility of growing saffron in the North East Region of India, with the same quality and higher quantity.

• The Botany and Horticulture department of Sikkim Central University carried out the soil and actual pH conditions of Yangyang of Sikkim and found it comparable to Saffron growing places of Kashmir.

Important Points

• Remunerative Approach for Agriculture and Allied sector Rejunivation, previously Rashtriya Krishi Vikas Yojana is a State Plan Scheme of Additional Central Assistance.

• It was launched in August 2007 as a part of the 11th Five Year Plan by the Government of India.

Q89. Answer: (d) Action and reaction forces act on the same body

The correct answer is Action and reaction forces act on the same body.

Confusion Points

• Newton's third law of motion-Action and reaction forces always act on different bodies.

• Hence, option 1 is correct and option 4 is incorrect.

Key Points

• According to Newton's third law of motion- "Every action has an equal and opposite reaction".

• This law represents a certain symmetry in nature: forces always occur in pairs, and one body cannot exert a force on another without experiencing a force itself.

• Application of Newton's third law of motion-

• When you jump, your legs apply a force to the ground, and the ground applies an equal and opposite reaction force that propels you into the air.

• Engineers apply Newton's third law when designing rockets and other projectile devices.

• Common examples of the third law of motion- A horse pulls a cart, a person walks on the ground, a hammer pushes a nail, the magnet attracts a paper clip.

• Newton's third law of motion-Action and reaction forces always act on different bodies.

Important Points

• According to Newton's First Law of Motion- " If a body in a state of motion it remains in a state of motion and if a body in a state of rest it remains in the state of rest until and unless external force applied on it. This is also called as law of inertia.

• According to Newton's Second Law of Motion- " Rate of change of momentum is directly proportional to the force applied to it".

Q90. Answer: (b) 4

There are total 4 triangles in the given figure.

Hence, “4”is the correct answer

Q91. Answer: (a) ‘Table’

In parks there are benches to sit on. Similarly, in restaurant there are table to sit on.

Hence, “Table” is the correct answer.

Q92. Answer: (a) Bulb

Petrol is required to run the car. Similarly, Electricity is required to light a bulb.

Hence, “Bulb” is the correct answer.

Q93. Answer: (b) Only conclusion II follows

The given statement explains the fact that success can be achieved only through hard work but it doesn’t explain the fact that every hard working person will be successful. So, conclusion I is invalid.

Conclusion II states that every successful person is hard working which certainly explains the fact about the statement. So, conclusion II is valid.

Q94. Answer: (d) Because the particles in ice absorb heat energy during the process of conversion from ice to liquid water.

The correct answer is Because the particles in ice absorb heat energy during the process of conversion from ice to liquid water.

Important Points

• At 0 °C Water has already absorbed the latent heat of fusion, ice at the same temperature has not absorbed the latent heat of fusion and has less kinetic energy.

• The molecules of water have more energy than the molecules of ice at the same temperature, this is because as ice is melted to

the liquid state, ice absorbed energy which is used in breaking the inter particles forces between the ice, and hence water molecules has more kinetic energy.

Additional Information

• Latent heat of fusion is the enthalpy change of any amount of substance when it melts.

• The Latent heat of fusion is the amount of heat required to change 1g of a substance at the temperature of its melting point from the solid to the liquid state without changing temperature.

• Kinetic energy is defined as the motion of particles or movement of any substance or motion possessed by a body.

Q95. Answer: (b) 1.6 × 10^(-19)C

The correct answer is 1.6 ×10^(–19) C.

Key Points

• Atoms are the smallest particle of the matter which is indivisible in nature i.e. cannot be further divided.

• Atoms consist of three fundamental particles - 1. Proton 2. Neutron 3. Electron.

• Proton and Neutron are present in the Nucleus of an Atom.

• While Electron revolves in the orbit of an atom.

• Proton discovered by E. Goldenstein and having Charge (+1.6 × 10^(-19)) and Mass (1.67 × 10^(-27)Kg).

• Electron discovered by J.J Thomson and having Charge (-1.6 × 10^(-19)) and Mass (9.1 × 10^(-31)Kg).

• Neutron discovered by James Chadwick and it is Neutral in nature i.e. zero charge or no charge and Mass (1.67 × 10^(-27)kg).

Q96. Answer: (a) 32

Calculation:

8^xcan be written as 2^(3x)

So, 8x/2y = 23x/2^y

=> 2^(3x-y)

Given that 3x - y = 5

=> 2^5 = 32

Alternate Method

Put x = 2 and y = 1, the condition satisfied.

Now,

8^x/2^y

=> $8^2/2^1$

=> 64/2

=> 32

Q97. Answer: (c) 1784

The correct answer is 1784.

Important Points

• Asiatic Society of Bengal, a scholarly society founded on Jan.15, 1784, by Sir William Jones.

• The Asiatic Society had the support and encouragement of Warren- Hastings, The Governor-General of Bengal, though he declined its presidency.

• Indian first admitted as a member in 1829, and its Headquarters are in Kolkata.

• The society owns an art collection that includes paintings by peter paul Rubens and Joshua Reynolds.

• The Sanskrit section of Society contains more than 27,000 books, manuscripts, prints, coins, and engravings.

• The journal of Asiatic Society of Bengal published regularly.

Q98. Answer: (b) 32%

The correct answer is 32%.

Key Points

• MSME means Micro, Small, Medium Scale Enterprises.

• It is primarily engaged in the production, manufacturing, processing, or preservation of goods and commodities.

• MSMEs are an important sector for the Indian economy and have contributed immensely to the country's socio-economic development.

• It not only generates employment opportunities but also works hand-in-hand towards the development of the nation's backward

and rural areas.

• Atam Nirbhar Bharat Abhiyan of 2020 given by the Government of India given a new definition to MSMEs.

• The Economic survey 2017-18 clearly shows MSMEs are handicapped by a dearth of credit to expand their businesses.

• Contributing 32% to the country's Gross Value Added(GVA), MSMEs also pave the way for industrialization in rural and backward areas.

• GVA means Gross Value Added.

• It is the measure of the value of goods and services produced in an area, industry, or sector of an economy.

Q99. Answer: (c) Statements 1 and 2 together are sufficient.

Statement 1:

“M is at the counter interacting with the staff”. It is clear from this statement that M is at the starting of the queue. So, this statement alone is not sufficient to answer the question.

Statement 2:

“O and P are standing in between M and Q”. It is clear from the statement that M or Q is at the farther end of queue. So, this statement alone is also not sufficient to answer the question.

Statement 1 + Statement 2:

It can be concluded that M is at the start of the queue and Q is at the farther end of queue. So, both statements are necessary to answer the question.

Hence, “Statements 1 and 2 together are sufficient” is the correct answer.

Q100. Answer: (d) 8.75

Shortcut Trick

For a proportion a : b ? c : d, the product of means equals the product of extremes.

Product of extremes (4 × x) = Product of means (5 × 7)

=> 4x = 35

=> x = 35 ÷ 4 = 8.75

Therefore The correct answer is 8.75.

Alternate Method

Given:

The proportion is 4 : 5 ? 7 : x

Formula Used:

If a, b, c, and d are in proportion (a : b ? c : d), then a/b = c/d.

Calculations:

=> 4/5 = 7/x

=> 4 × x = 7 × 5

=> 4x = 35

=> x = 35/4

=> x = 8.75

Therefore The correct answer is 8.75.

Additional Information

Fourth Proportional

In the proportion a : b :: c : d, 'd' is known as the Fourth Proportional to a, b, and c. It is calculated as d = (b × c) ÷ a.

Mean Proportional

The Mean Proportional between two numbers 'a' and 'b' is calculated as √(a × b).

Third Proportional

In a continued proportion a : b :: b : c, 'c' is the Third Proportional to a and b, calculated as c = b^2 ÷ a.

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