General Intelligence and Reasoning

Instructions
For the following questions answer them individually

Question 1
Select the correct mirror image of the given figure when a mirror is placed on the right side of the figure.

A
[Image]

B
[Image]

C
[Image]

D
[Image]

Answer: A

Explanation:
Option A is the mirror image of the question figure.

∴ The correct answer is option A.

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Question 2
In a certain code language, 'EARTH' is coded as '8201815'. How will 'ORBIT' be coded as in that language?

A 18172372
B 20921815
C 37681026

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Answer: B

Explanation:

Similarly,

Answer: A

Explanation:

Question 4

Select the option that depicts how the given transparent sheet of paper would appear if it is folded at the dotted line.

A
The correct answer is option C.

Explanation:
The sheet will be appear as,

, The correct answer is option C.

Question 5
How many rectangles are there in the given figure?

A 15
B 17
C 11
D 13

Answer: B

Explanation:
Number of rectangles in EFHG = 1 + 2 + 3 = 6
Number of rectangles in ABCD = 1 + 2 + 3 + 4 = 10
1 rectangle is IJKL.
So, total rectangles = 6 + 10 + 1 = 17
∴ The correct answer is option B.

**Question 6**

In the given Venn diagram, the ‘rectangle’ represents ‘engineers’, the ‘circle’ represents ‘managers’, and the ‘triangle’ represents ‘married’. The numbers given in the diagram represent the number of persons in that particular category.

How many people are married but are NOT engineers?

A 29  
B 16  
C 70  
D 13  

Answer: A

Explanation:

Number of people are married but are NOT engineers = 13 + 16 = 29
∴ The correct answer is option A.

**Question 7**

In a certain code language, ‘JUPITER’ is written as ‘JVOJSFR’. How will ‘NEPTUNE’ be written as in that language?

A NDPSVME  
B NGOUTOE  
C NFOUTOE  
D NFOSTOE  

Answer: C

Explanation:

\begin{align*}
J &= J \\
U + 1 &= V \\
P - 1 &= O \\
I + 1 &= J
\end{align*}
T - 1 = S
E + 1 = F
R = R
Similarly,
N = N
E + 1 = F
P - 1 = O
T + 1 = U
U - 1 = T
N + 1 = O
E = E

'NEPTUNE' is written as 'NFOUTOE'.
∴ The correct answer is option C.

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Question 8
A product was marked for sale with a label price, which is at 20% discount on the printed price. At the time of sale, the shopkeeper gave an additional 10% discount on the label price. If a customer bought the product at ₹468, then what is the printed price of the product?

A ₹700
B ₹650
C ₹520
D ₹600

Answer: B

Explanation:
Let the printed price be 100%.
Discount = 20%
Label price = 100 - 20 = 80%
Additional discount = 10%
Selling price = 100 - 10 = 90% of label price = 80 \times \frac{90}{100} = 72%
72% = 468
Printed price(100%) = \frac{650}{72} \times 100 = 650

Question 9
A + B means 'A is the wife of B';
A − B means 'B is the daughter of A';
A \times B means 'B is the brother of A';
A ÷ B means 'A is the father of B'.
If, P + R \times T − Q + S ÷ U, then how is P related to the mother of U?

A Maternal grandmother
B Mother
C Paternal grandmother
D Aunt

Answer: D

Explanation:
In the diagram, Circle shows the female, square shows the male, vertical lines show the generation, single horizontal line shows the brother/sister and double horizontal lines show the couple.

From the diagram,
Mother of 'U' is aunt of the 'P'.

Question 10

Arrange the following words in a logical and meaningful order (according to population).
1. Andhra Pradesh
2. Madhya Pradesh
3. Arunachal Pradesh
4. Uttar Pradesh
5. Himachal Pradesh

A 4-1-2-3-5
B 4-2-1-5-3
C 4-1-2-5-3
D 4-2-1-3-5

Answer: B

Explanation:
State According to population,
Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Himachal Pradesh, Arunachal Pradesh
∴ The correct answer is option B.

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Question 11

Select the option in which the words share the same relationship as that shared by the given pair of words.
Dentist : Doctor

A Line : Circle
B Algebra : Geometry
C Chemistry : Science
D Biology : Astrology

Answer: C

Explanation:
Dentist come under the doctor similarly,
Chemistry come under the chemistry.
∴ The correct answer is option C.
Question 12

Which two signs should be interchanged to make the given equation correct?

\[121 + 11 - 42 \times 6 \div 7 = 83\]

A. \( \quad - \text{and} \div \)

B. \( + \text{and} \div \)

C. \( \div \text{and} \times \)

D. \( \times \text{and} - \)

Answer: C

Explanation:

From the option C,

\[121 + 11 - 42 \div 6 \times 7 = 83\]
\[121 + 11 - 49 = 83\]
\[83 = 83\]

∴ The correct answer is option C.

Question 13

Select the option in which the given figure is embedded (rotation is not allowed).

Answer: A

Explanation:
The question figure is shown by red line.

∴ The correct answer is option A.

Question 14

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

A

B

C

D

Answer: C

Explanation:
In the each figure, pentagon and arrow rotate 180° in each step and figure are also rotate 90° in anti clock direction so,

Next step,

∴ The correct answer is option C.
Question 15
Four number-pairs have been given, out of which three are alike in some manner and one is different. Select the number-pair that is different.

A  10 : 123
B  17 : 290
C  14 : 227
D  11 : 146

Answer: B

Explanation:
In 10 : 123,
\[(10 + 1)^2 + 2 = 121 + 2 = 123\]
In 17 : 290,
\[(17 + 1)^2 + 2 = 324 - 34 = 290\]
In 14 : 227,
\[(14 + 1)^2 + 2 = 225 + 2 = 227\]
In 11 : 146,
\[(11 + 1)^2 + 2 = 144 + 2 = 146\]
\therefore The correct answer is option B.

Question 16
Select the option in which the number set shares the same relationship as that shared by the given number set.
(17, 24, 45)

A  (18, 23, 46)
B  (19, 26, 34)
C  (15, 20, 43)
D  (12, 19, 40)

Answer: D

Explanation:
In (17, 24, 45),
\[17 + 7 = 24 + 21 = 45\]
Similarly,
From (12, 19, 40),
\[12 + 7 = 19 + 21 = 40\]
\therefore The correct answer is option D.
Question 17
Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follows from the statement(s).

Statements:
All singers are dancers.
No dancer is a plumber.

Conclusions:
I. No plumber is a singer.
II. Some singers are plumbers.
III. Some dancers are singers.

A. Only conclusion I follows.
B. Only conclusions II and III follow.
C. Only conclusions I and III follow.
D. Only conclusion II follows.

Answer: C

Explanation:
From the Venn diagram,
Only conclusions I and III follow.
\[ \therefore \] The correct answer is option C.

Question 18
Select the number that can replace the question mark (?) in the following series.
1537, 1539, 1543, ?, 1557, 1567

A. 1553
B. 1550
C. 1546
D. 1549

Answer: D

Explanation:
The series follows pattern as,
1537 + 2 = 1539
1539 + 4 = 1543
1543 + 6 = 1549
1549 + 8 = 1557
1567 + 10 = 1577
\[ \therefore \] The correct answer is option D.

Question 19
Four words have been given, out of which three are alike in some manner and one is different. Select the odd word.
Hyderabad
Aurangabad
Chennai
Gangtok

Answer: B

Explanation:
Except option B, remaining all are capitals.

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Question 20
Select the letter-cluster that can replace the question mark (?) in the following series.
DAG, FCI, ?, JGM, LIO

A GDJ
B IFL
C HKE
D HEK

Answer: D

Explanation:
The series follows pattern as,
(D + 2)(A + 2)(G + 2) = FCI
(F + 2)(C + 2)(I + 2) = HEK
(H + 2)(E + 2)(K + 2) = JGM
(J + 2)(G + 2)(M + 2) = LIO
∴ The correct answer is option D.

Question 21
'Wheat' is related to 'Bread' in the same way as 'Sugarcane' is related to '...............'

A Jaggery
B Mayonnaise
C Grass
D Ketchup

Answer: A

Explanation:
'Bread' made by 'Wheat' similary,
'Jaggery' Made by 'Sugarcane'.
∴ The correct answer is option A.

Question 22
Fourletter-clusters have been given, out of which three are alike in some manner andone is different. Select the odd letter-cluster.

A FGL
Explanation:
\[ F + 1 = G + 5 = L \]
\[ A + 1 = B + 4 = F \]
\[ I + 1 = J + 4 = N \]
\[ M + 1 = N + 4 = R \]
So, option A is odd.
∴ The correct answer is option A.

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**Question 23**
Select the letter that can replace the question mark (?) in the following series.
A, E, J, ?, W
A R
B P
C S
D Q

Answer: B

Explanation:
The series follows pattern as,
\[ A + 4 = E \]
\[ E + 5 = J \]
\[ J + 6 = P \]
\[ P + 7 = W \]
∴ The correct answer is option B.

**Question 24**
Three different positions of the same dice are shown. Select the symbol that will be on the face opposite to the one showing ‘=’.

![Dice Image]

A $  
B #  
C %  
D *

Answer: A

Explanation:
From last 2 figures,
Study the given pattern carefully and select the number that can replace the question mark (?) in it.

```
130 4 100 10
? 52 34
```

A 64
B 96
C 82
D 74

Answer: D

Explanation:
4 + 6 = 10
10 + (6 + 4 = 10) = 20
20 + (10 + 4 = 14) = 34
34 + (14 + 4 = 18) = 52
52 + (18 + 4 = 22) = 74
74 + (22 + 4 = 26) = 100
100 + (26 + 4 = 30) = 130

∴ The correct answer is option D.

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General Awareness

Instructions
For the following questions answer them individually

Question 26

Four multi-storied illegal constructions - Jain Coral Cove, H2O Holy Faith, Alfa Serene and Golden Kayaloram - were razed to the ground in January 2020 following Supreme Court instructions. In which state did this happen?

A Karnataka
B Goa
C Kerala
D Tamil Nadu

Answer: C
Question 27
Name the company that has acquired an online travel portal Yatra Online Inc., for an enterprise value of $337.8 million, in an all-stock transaction.

A  Make my trip.com
B  Trivago
C  Ebix Inc.
D  Trip Advisor
Answer: C

Question 28
Which of the following is an INCORRECT sequence of Mughal rulers?

A  Jahangir, Shah Jahan, Aurangzeb
B  Akbar, Shah Jahan, Jahangir
C  Babur, Humayun, Akbar
D  Akbar, Jahangir, Shah Jahan
Answer: B

Question 29
The recently revoked ‘Article 370’ is associated with which of these states of India?

A  Assam
B  Sikkim
C  Nagaland
D  Kashmir
Answer: D

Question 30
Bhavai and Kalbelia as traditional dance forms, owe their genesis to which Indian state?

A  Punjab
B  Rajasthan
C  Assam
D  Odisha
Answer: B
Question 31
Iranian Major General Qasem Soleimani was recently (2020) assassinated by the US military in _____.

A United Arab Emirates  
B Iraq  
C Saudi Arabia  
D Pakistan  

Answer: B

Question 32
Who is the only scientist in the world to have won the Nobel prize in Chemistry twice?

A Linus Carl Pauling  
B Roger D. Kornberg  
C Madame Curie  
D Frederick Sanger  

Answer: D

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Question 33
The American scientist Edwin Hubble’s name is associated with which of these theories?

A Lattice Gauge Theory  
B Quantum Chromodynamics Theory  
C Partial Coherence of Light Theory  
D The Big Bang Theory  

Answer: D

Question 34
The city of Vijayawada lies on the banks of which of these rivers?

A Mahanadi  
B Tapti  
C Krishna  
D Godavari  

Answer: C

Question 35
Only one Indian batsman has scored a triple century in test cricket other than Virender Sehwag. Name this batsman.
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Question 36
What is the name of the phenomena in physics and astronomy which involves the splitting of a spectral line into two or more components of slightly different frequency when the light source is placed in a magnetic field?

A  Lumen Effect  
B  Alpenglow Effect  
C  Zeeman Effect  
D  Raman Effect  
Answer: C

Question 37
When does the entire earth experience equal days and nights?

A  Day of winter solstice  
B  Day of summer solstice  
C  At orbital plane  
D  Day of equinox  
Answer: D

Question 38
Who among the following is the current (January 2020) Governor of Kerala?

A  Arif Mohammed Khan  
B  Satya Pal Mallik  
C  Lalji Tandon  
D  B.D. Mishra  
Answer: A

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Question 39
Name the two Indian actors who shared the National Best Actor Award (Male) in the 66th National Film Awards 2019.
A  Ayushmann Khurrana and Vicky Kaushal
B  Ranbir Kapoor and Akshay Kumar
C  Nana Patekar and Mohanlal
D  Amitabh Bachchan and Ranbir Kapoor

Answer: A

Question 40

Former union minister and former Karnataka CM, D.V. Sadananda Gowda is a cabinet minister in the current central cabinet (February-2020). What is his portfolio?

A  Law and Justice
B  Chemicals and Fertilizers
C  Public Distribution
D  Tribal Affairs

Answer: B

Question 41

Who among the following is known as the 'father of Muslim renaissance' in Bengal?

A  Sir Sayed Ahmed Khan
B  Ameer Ali
C  Nawab Abdul Latif Khan
D  Nawab Salimullah Khan

Answer: C

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Question 42

Name the author of the 2019 released book - 'The Scent of God'.

A  Nayantara Sehgal
B  Githa Hariharan
C  Saikat Majumdar
D  Himanjali Sankar

Answer: C

Question 43

What is the name of the phenomena (driven by the scattering of light) in which mountain tops acquire a rosy or orange hue around sunrise and sunset?
A  Brillouin scattering
B  Circle of confusion
C  Alpenglow
D  Barrel distortion
   Answer: C

Question 44
How many members did the International Monetary Fund (IMF) have as of January 2020?

A  164
B  174
C  189
D  182
   Answer: C

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Question 45
The 3rd Khelo India Youth Games 2020 is hosted by which Indian state?

A  Assam
B  Kerala
C  Karnataka
D  Punjab
   Answer: A

Question 46
From which of the following states does 2019 Padma Vibhushan winner, Teejan Bai hail?

A  Chhattisgarh
B  Gujarat
C  Odisha
D  Telangana
   Answer: A

Question 47
Which of these is the energy conversion that happens in the process called photosynthesis?

A  Potential energy to chemical energy
B  Light energy to chemical energy

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C Heat energy to chemical energy
D Heat energy to light energy
Answer: B

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Question 48
Who was the then Governor-General of British India, when ‘Sati Pratha’ became illegal and punishable?

A Lord Cornwallis
B Lord Wellesley
C Lord William Bentinck
D Warren Hastings
Answer: C

Question 49
Which of the following is an Indian Research Station in the Antarctica Region?

A Orcadas
B Maitri
C Hope Bay
D Mawson
Answer: B

Question 50
Who is the author of the delightful and anecdotal history of Indian cricket titled - ‘A Corner of a Foreign Field: The Indian History of a British Sport’?

A Sanjay Singh
B Ramachandra Guha
C Bipin Chandra
D Romila Thapar
Answer: B

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Quantitative Aptitude

Instructions
For the following questions answer them individually
Question 51

The given table represents the production of different types of motorcycles (in thousands) over a period of six years. Study the table carefully and answer the question that follows.

<table>
<thead>
<tr>
<th>Year (→)</th>
<th>Motorcycles (type) ↓</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>55</td>
<td>84</td>
<td>85</td>
<td>89</td>
<td>80</td>
<td>98</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>98</td>
<td>87</td>
<td>89</td>
<td>88</td>
<td>96</td>
<td>92</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>104</td>
<td>89</td>
<td>95</td>
<td>92</td>
<td>100</td>
<td>110</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>103</td>
<td>100</td>
<td>102</td>
<td>95</td>
<td>104</td>
<td>120</td>
</tr>
</tbody>
</table>

During 2015, the production of which type of motorcycle was more than 25% of the total production of all types of motorcycles in 2017?

A  A  B  B  C  C  D  D

Answer: D

Explanation:
Total production of all types of motorcycles in 2017 = 80 + 96 + 100 + 104 = 380
25% of the total production of all types of motorcycles in 2017 = 380 \times \frac{25}{100} = 95

During 2015, the production of D type of motorcycle was more than 25% of the total production of all types of motorcycles in 2017

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Question 52

The average age of a number of persons in a group was calculated as 35 years, which was 2.5 years more than the correct average as there was an error in recording the age of two persons as 38.5 years and 40 years instead of 29 years and 22 years respectively. The number of persons in the group was:

A  11
B  12
C  15
D  13

Answer: A

Explanation:
Let the number of persons be x.
Wrong average = 35
Total age for wrong average = 35x
Correct average = 35 - 2.5 = 32.5
Total age for correct average = 32.5x
Correct age of two persons = 29 + 22 = 51
Wrong age of two persons = 38.5 + 40 = 78.5
Difference = 78.5 - 51
35x - 32.5x = 27.5
x = 27.5/2.5 = 11

Question 53
If $\sec \theta + \tan \theta = p$, $0^\circ < \theta < 90^\circ$, then $\frac{p^2-1}{p^2+1}$ is equal to:

A. cosec $\theta$
B. sin $\theta$
C. cos $\theta$
D. 2 cosec $\theta$

Answer: B

Explanation:
$\sec \theta + \tan \theta = p$
$(\sec \theta + \tan \theta)^2 = p^2 \implies (1)$
$p^2 - 1 = \frac{p^2 - 1}{p^2 + 1}$

From eq(1),
$\sec^2 \theta + 2 \sec \theta \tan \theta + \tan^2 \theta = p^2$
$\sec^2 \theta + 2 \sec \theta \tan \theta + \tan^2 \theta = p^2$

$\sec \theta = \frac{p^2 - 1}{p^2 + 1}$

Question 54

The chords AB and CD of a circle intersect at E. If AE = 12 cm, BE = 20.25 cm and CE = 3 DE, then the length (in cm) of CE is:

A. 27
B. 25.5
C. 18
D. 28.5

Answer: A

Explanation:
By the property,
\[ AE \times EB = DE \times CE \]
\[ 12 \times 20.25 = DE \times 3DE \]
\[ 243 = 3DE^2 \]
\[ DE^2 = 81 \]
\[ DE = 9 \text{ cm} \]
\[ CE = 3DE = 3 \times 9 = 27 \text{ cm} \]

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Question 55
If \( x + y + z = 3 \), and \( x^2 + y^2 + z^2 = 101 \), then what is the value of \( \sqrt{x^3 + y^3 + z^3 - 3xyz} \)?

A 19  
B 21  
C 24  
D 28  

Answer: B

Explanation:
\[ x^3 + y^3 + z^3 - 3xyz = (x+y+z) [(x + y + z)^2 - 3(xy + yz + zx)] \] \( -(1) \)

And,
\[ (x + y + z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx) \]

On put the values,
\[ 3^2 = 101 + 2(xy + yz + zx) \]
\[ xy + yz + zx = -92/2 = -46 \]

From the eq(1),
\[ x^4 + y^4 + z^4 - 3xyz = (3) [(3)^2 - 3(-46)] = 3 \times 147 = 441 \]
\[ \sqrt{x^3 + y^3 + z^3 - 3xyz} = \sqrt{441} = 21 \]

Question 56
If \( 12x^2 - 21x + 1 = 0 \), then what is the value of \( 9x^2 + (16x^2)^{-1} \)?

A \( \frac{429}{8} \)
B \( \frac{465}{16} \)
C \( \frac{417}{16} \)
Question 57

A sum of ₹ x was divided between A, B, C and D in the ratio 1:3:5:6:9. If the difference between the shares of B and D is ₹832, then the value of x is:

A ₹7,592
B ₹7,384
C ₹7,696
D ₹7,488

Answer: A

Explanation:
Ratio of A, B, C and D = 1:3:5:6:9 = 30:18:15:10
Let the share of A, B, C and D be 30p, 18p, 15p and 10p.
The difference between the shares of B and D = 832
18p - 10p = 832
p = 832/8 = 104
x = 30p + 18p + 15p + 10p = 73p
x = 73 × 104 = Rs.7592

Question 58

The area of a field in the shape of a regular hexagon is $2400\sqrt{3}m^2$. The cost of fencing the field at ₹16.80/metre is:

A ₹4,536
B ₹3,024
C ₹4,032
D ₹3,528

Answer: C
Explanation:
Area of a hexagon = \( \frac{3\sqrt{3}a^2}{2} \)
\( a = \) side
\[ 2400\sqrt{3} = \frac{3\sqrt{3}a^2}{2} \]
\( a^2 = 1600 \)
\( a = 40 \) m
Perimeter = \( 6a = 6 \times 40 = 240 \) m
The cost of fencing the field = \( 240 \times 16.8 = \) Rs.4032

Question 59
Places A and B are 144 km apart. Two cars start simultaneously, one from A and the other from B. If they move in the same direction, they meet after 12 hours, but if they move towards each other they meet after \( \frac{9}{8} \) hours. The speed (in km/h) of the car moving at a faster speed, is:

A 70
B 72
C 60
D 64

Answer: A

Explanation:
Speed of faster car = \( v_1 \)
Speed of slower car = \( v_2 \)
Case I: Cars travel in same direction
144 km distance covered in 12 hours so,
Relative speed = \( v_1 - v_2 \)
\( v_1 - v_2 = \frac{144}{12} = 12 \) ---(1)
Case II: Cars in opposite direction
144 km distance covered in \( \frac{9}{8} \) hours so,
Relative speed = \( v_1 + v_2 \)
\( v_1 + v_2 = \frac{144}{\frac{9}{8}} = 128 \) ---(2),
From eq(1) and (2),
\( 2v_1 = 12 + 128 \)
\( v_1 = \frac{140}{2} = 70 \) km/hr
\[ \therefore \text{The speed of faster car is 70 km/hr.} \]

Question 60
A, B and C donate 8%, 7% and 9%, of their salaries, respectively to a charitable trust. The salaries of A and B are same and the difference between their donations is Rs 259. Thetotal donation of A and B is Rs 1,185 more than that of C. The total donation of A and C is what percentage of the total salaries of A, B and C? (Correct to one decimal place)

A 6.2%
B 5.8%
Answer: B

Explanation:
Let the salaries of A, B and C be x, x, y.
Donation of A, B and C = 0.08x, 0.07x and 0.09z
Difference between donations of A and B = 259
0.08x - 0.07x = 259
x = 259/0.01 = 25900
Total donation of A and B = donation of A + 1185
0.08x + 0.07x = 0.09z + 1185
0.15x = 0.09z + 1185
0.09z = 0.15 \times 25900 - 1185 = 2700
z = 2700/0.09 = 30000
Total donation of A and C = 0.08x + 0.09z
= 0.08 \times 25900 + 2700 = 2072 + 2700 = 4772
Total salaries of A, B and C = 25900 + 25900 + 30000 = 81800
Required percentage = \frac{4772}{81800} \times 100 = 5.8%
w \times 5 = \frac{5}{2} \times (4 \times 2w + 6w) \times 5

w \times 5 = \frac{5}{2} \times 14w \times 5

w = 35 \text{ women}

So need for worker = 25w + 10w

Number of man = 10 \times \frac{m}{2} = 5 \text{ man}

**Question 62**

In \( \triangle ABC \), \( \angle B = 72^\circ \) and \( \angle C = 44^\circ \). Side BC is produced to D. The bisectors of \( \angle B \) and \( \angle ADC \) meet at E. What is the measure of \( \angle BEC \)?

A 58°

B 46°

C 32°

D 36°

Answer: C

Explanation:

In \( \triangle ABC \),

\[ \angle A + \angle B + \angle C = 180^\circ \]

\[ \angle A = 180 - 72 - 44 = 64^\circ \]

By angle bisector property,

\[ \angle BEC = \frac{\angle A}{2} \]

\[ \angle BEC = \frac{64^\circ}{2} = 32^\circ \]

**Question 63**

In \( \triangle ABC \), \( AC = 8.4 \text{ cm} \) and \( BC = 14 \text{ cm} \). P is a point on AB such that CP = 11.2 cm and \( \angle AC \rightleftharpoons = \angle B \). What is the length (in cm) of BP?

A 4.12

B 2.8

C 3.78

D 3.6

Answer: C

Explanation:
\( \triangle ACP \sim \triangle ABC \)
\( \because \angle A \text{ is common and } \angle ACP = \angle B \)

From first two,
\[ \frac{AB}{BC} = \frac{AC}{CP} \]
\[ AC = CP = AP \]

From last two,
\[ \frac{BP}{AP} = \frac{AB}{AP} \]
\[ AP = 6.72 \text{ cm} \]
\[ BP = AB - AP = 10.5 - 6.72 = 3.78 \text{ cm} \]

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**Question 64**

If \( 2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8zx = (Ax + y + Bz)^2 \), then the value of \( (A^2 + B^2 - AB) \) is:

A 16  
B 14  
C 6  
D 18

**Answer:** C

**Explanation:**
\[ 2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8zx = (Ax + y + Bz)^2 \]
\[ = 2x^2 + y^2 + 8z^2 + 2(-\sqrt{2}xy - 2\sqrt{2}yz + 4zx) = (Ax + y + Bz)^2, \]
\[ = 2x^2 + y^2 + 8z^2 + 2(-\sqrt{2}x.y - y.2\sqrt{2}z + \sqrt{2}x.2\sqrt{2}z) = (Ax + y + Bz)^2 \]
\[ = (+\sqrt{2}x - y + 2\sqrt{2}z)^2 = (Ax + y + Bz)^2 \]
\[ Ax = \sqrt{2}x \]
\[ A = \sqrt{2} \]
\[ y = -1 \]
\[ B = 2\sqrt{2} \]

Now,
\[ (A^2 + B^2 - AB) \]
Question 65

How many numbers are there from 200 to 800 which are neither divisible by 5 nor by 7?

A 407
B 410
C 413
D 411

Answer: D

Explanation:
Total numbers = (800 - 200) + 1 = 601
Number of terms which divide by 5
l = 800
a = 200
Common difference(d) = 5
l = a + (n-1)d
800 = 200 + (n - 1)5
n-1 = 120
n = 121
Number of terms which divide by 7
l = 798
a = 203
Common difference(d) = 7
l = a + (n-1)d
798 = 203 + (n - 1)7
n-1 = 85
n = 86
Number of terms which divide by 5 and 7
l = 770
a = 210
Common difference(d) = 35
l = a + (n-1)d
770 = 210 + (n - 1)35
n-1 = 16
n = 17
Number of terms which divide by either 5 or 7 = 121 + 86 - 17 = 190
Number of terms which divide by neither 5 nor 7 = 601 - 190 = 411

Question 66

The value of \( \frac{8 \div [(8 - 3) - ((4 \div 4) + 4 - 4 \div 8) - 2]}{8 \times 8 - 8 \times 8 \div 2 - 7} \) is:
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Instructions

The given table represents the production of different types of motorcycles (in thousands) over a period of six years. Study the table carefully and answer the question that follows.

<table>
<thead>
<tr>
<th>Year</th>
<th>Motorcycles (type)</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>55</td>
<td>84</td>
<td>85</td>
<td>89</td>
<td>80</td>
<td>98</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>98</td>
<td>87</td>
<td>89</td>
<td>88</td>
<td>96</td>
<td>92</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>104</td>
<td>89</td>
<td>95</td>
<td>92</td>
<td>100</td>
<td>110</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>103</td>
<td>100</td>
<td>102</td>
<td>95</td>
<td>104</td>
<td>120</td>
</tr>
</tbody>
</table>

Question 67

What is the percentage increase in the total production of all types of motorcycles from 2014 to 2018?

A: \( \frac{3}{17} \)

B: \( \frac{17}{3} \)

C: \( \frac{2}{17} \)
Total production of all types of motorcycles in 2014 = 84 + 87 + 89 + 100 = 360
Total production of all types of motorcycles in 2018 = 98 + 92 + 110 + 120 = 420
Percentage increment = \( \frac{420-360}{360} \times 100 = \frac{60}{360} \times 100 = 16.7\% \)

Question 68
By what percentage is the total production of type A motorcycles over six years, less than the total production of all types of motorcycles in 2013 and 2016?

A 32.2
B 32.8
C 31.6
D 30.5
Answer: D

Total production of type A motorcycles over six years = 95 + 84 + 85 + 89 + 80 + 98 = 531
Total production of all types of motorcycles in 2013 and 2016 = 95 + 98 + 104 + 103 + 89 + 88 + 92 + 95 = 764
Required percentage = \( \frac{764 - 531}{764} \times 100 = \frac{233}{764} \times 100 = 30.5\% \)

Instructions
For the following questions answer them individually

Question 69
Two circles of radii 7 cm and 5 cm intersect each other at A and B, and the distance between their centres is 10 cm. The length (in cm) of the common chord AB is:

A \( \frac{3\sqrt{66}}{5} \)
B \( \frac{4\sqrt{66}}{5} \)
C \( \frac{2\sqrt{71}}{5} \)
D \( \frac{3\sqrt{71}}{5} \)
Answer: B

Explanation:
AP = 5 cm
AQ = 7 cm
PQ = 10 cm
Let the CQ be \( x \). So,
PC = 10 - \( x \) cm
\( \triangle ACQ \) is right angle triangle so,
\[ (AQ)^2 = (AC)^2 + (GQ)^2 \]
\[ (7)^2 = (AC)^2 + (x)^2 \]
\[ (AC)^2 = 49 - (x)^2 \] ---(1)
\( \triangle APC \) is right angle triangle so,
\[ (AP)^2 = (AC)^2 + (PC)^2 \]
\[ (5)^2 = (AC)^2 + (10 - x)^2 \]
\[ (AC)^2 = 25 - (10 - x)^2 \] ---(2)
From eq(1) and (2),
\[ 49 - (x)^2 = 25 - (10 - x)^2 \]
\[ 24 - (x)^2 = -(10 - x)^2 \]
\[ (x)^2 = 24 + 100 - x^2 - 20x \]
\[ 20x = 124 \]
\[ x = 124/20 = 6.2 \text{ cm} \]
From eq(1),
\[ (AC)^2 = 49 - (6.2)^2 \]
\[ (AC)^2 = 49 - 38.44 \]
\[ (AC)^2 = 10.56 \]
\[ AC = \frac{\sqrt{10.56}}{5} \]
The common chord \( AB = 2 \times \frac{\sqrt{10.56}}{5} = \frac{4\sqrt{66}}{5} \)

General Science Notes for SSC CGL

**Question 70**

If the selling price of an article is 8% more than the cost price and the discount offered is 10% on the marked price of the article, then what is the ratio of the cost price to the marked price?

A 5 : 6

B 8 : 9

C 3 : 4

D 4 : 5

**Answer:** A

**Explanation:**
Profit = 8%
Let the cost price be Rs.100.
Selling price = 108
Discount on marked price = 10% so,
selling price = 100 - 10 = 90%

90% = 108

Marked price(100%) = 108 \times \text{Rs.}120

Ratio of the cost price to the marked price = 100 : 120 = 5 : 6

Question 71

The given table represents the production of different types of motorcycles (in thousands) over a period of six years. Study the table carefully and answer the question that follows.

<table>
<thead>
<tr>
<th>Year</th>
<th>Motorcycles (type)</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
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<td>80</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>58</td>
<td>87</td>
<td>89</td>
<td>88</td>
<td>96</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>C</td>
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<td>95</td>
<td>92</td>
<td>100</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>103</td>
<td>100</td>
<td>102</td>
<td>95</td>
<td>104</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

What is the ratio of the total number of motorcycles of type B produced in 2016 and 2018 to the total number of motorcycles of type D produced in 2013, 2015 and 2016?

A  1 : 2
B  3 : 4
C  3 : 5
D  2 : 3

Answer: C

Explanation:
Total number of motorcycles of type B produced in 2016 and 2018 = 88 + 92 = 180

Total number of motorcycles of type D produced in 2013, 2015 and 2016 = 103 + 102 + 95 = 300

Ratio of the total number of motorcycles of type B produced in 2016 and 2018 to the total number of motorcycles of type D produced in 2013, 2015 and 2016 = 180 : 300 = 3 : 5

Question 72

A sum of ₹8,000 invested at 10% p.a. amounts to ₹9,261 in a certain time, interest compounded half-yearly. What will be the compound interest (in ₹) on the same sum for the same time at double the earlier rate of interest, when interest is compounded annually?

A  ₹2,520
B  ₹2,480
C  ₹2,560
D  ₹2,500

Answer: C

Explanation:
for half yearly,
rate(r) = 10/2 = 5
p = 8000
Amount = 9261
Amount = p(1 + r / 100)^t
9261 = 8000(1 + 100)^t
\[
\frac{9261}{8000} = \left(\frac{105}{100}\right)^t
\]
\[
\left(\frac{21}{20}\right)^3 = \left(\frac{21}{20}\right)^t
\]
t = 3 years
Time = 3/2 years
Now,
\[r1 = 2r = 2 \times 10 = 20\]
Compound interest = \[p(1 + \frac{r}{100})^t - p\]
= \[8000\left(1 + \frac{20}{100}\right)^3/2 - 8000\]
= \[8000 \times \frac{6}{5} \times \sqrt[5]{6} - 8000\]
= \[10560 - 8000 = Rs.2560\]

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Question 73
A sells an article to B at a loss of 20%, B sells it to C at a profit of 12.5% and sells it to D at a loss of 8%. If D buys it for ₹248.40, then what is the difference between the loss incurred by A and C?

A  ₹36.80
B  ₹38.40
C  ₹42.60
D  ₹39.20

Answer: B

Explanation:
Cost price for D = 248.40
Loss for C = 8%
Cost price for C = 248.40 \times \frac{100}{92} = 270
Loss of C = 270 - 248.4 = 21.6
Selling price for B = Rs. 270
Profit = 12.5%
Cost price for B = 270 \times \frac{100}{112.5} = 240
Selling price for A = Rs.240
Loss = 20%
Cost price for A = 240 \times \frac{100}{80} = 300
Loss for A = 300 - 240 = 60
Difference between the loss incurred by A and C = 60 - 21.6 = Rs. 38.4

Question 74
If \[7 \cos^2 \theta + 3 \sin^2 \theta = 6, 0^\circ < \theta < 90^\circ\], then the value of \[\cot^2 \theta + \sec^2 \theta \] is:
Question 75

The value of \( \frac{\cos 9^\circ + \sin 81^\circ}{2 \sin^2 63^\circ + 1 + 2 \sin 2^\circ 27} \) is:

A \( \frac{1}{2} \)

B \( \frac{4}{3} \)

C 2

D 1

Answer: B

Explanation:
\[ (\cos 9^\circ + \sin 81^\circ)(\sec 9^\circ + \csc 81^\circ) \]
\[ = \frac{2 \sin^2 63^\circ + 1 + 2 \sin 2^\circ 27}{2 \sin^2 63^\circ + 1 + 2 \sin (90 - 63)} \]
\[ = \frac{(\sin 81^\circ + \sin 81^\circ)(\csc 81^\circ + \csc 81^\circ)}{2 \sin 63^\circ + 1 + 2 \cos 63^\circ} \]
\[ = \frac{2 \sin 81^\circ (2 \csc 81^\circ - \csc 81^\circ)}{2 + 1} = \frac{4}{3} \]
Instructions
For the following questions answer them individually

Question 76
Select the most appropriate option to fill in the blank.
Being a millionaire, he is leading a ______ life.

A expensive
B conducive
C destitute
D luxurious

Answer: D

Question 77
Select the most appropriate ANTONYM of the given word.
Sparse

A Costly
B Tranquil
C Scanty
D Abundant

Answer: D

Question 78
Select the correct passive form of the given sentence.
Did the problems you had to face discourage you?

A Are you being discouraged by the problems you had to face?
B Have you been discouraged by the problems you have to face?
C Are you discouraged by the problems you had to face?
D Were you discouraged by the problems you had to face?

Answer: D

Question 79
Select the word which means the same as the group of words given.
One who is preoccupied with his own interests

A Egoist

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Question 80

Given below are four jumbled sentences. Out of the given options pick the one that gives their correct order.

A. Upon returning from his travels, he was forced to live in a house where his large family lived.
B. Vaikom Muhammad Basheer was a Malayalam fiction writer from Vaikom in Kerala.
C. The household was always noisy and full of chaos, no place for a writer surely!
D. Apart from family members, myriads of domestic animals also treated the house as their own.

A. BCAD
B. BCDA
C. BADC
D. BDCA

Answer: C

Question 81

Select the INCORRECTLY spelt word.

A. Ignorance
B. Influence
C. Itinerent
D. Impeach

Answer: C

Instructions

In the following passage some words have been deleted. Fill in the blanks with the help of the alternatives given. Select the most appropriate option for each blank.

**Comprehension**:

Milton Hershey returned to the village where he had been born, in the heart of dairy country. He opened his chocolate manufacturing plant (1)______ 1905. With access to all the fresh milk he (2)______, he began producing the finest milk chocolate. The plant (3)______ opened in a small Pennsylvania village is today the (4)______ chocolate factory in the world. The confections created here are (5)______ around the world.

Question 82

Select the most appropriate option to fill in blank 1.

A. to
B. at
C. in

Answer: B
Question 83
Select the most appropriate option to fill in blank 2.

A considered  
B kneaded  
C distributed  
D needed  
Answer: D

Question 84
Select the most appropriate option to fill in blank 3.

A that  
B when  
C who  
D what  
Answer: A

Question 85
Select the most appropriate option to fill in blank 4.

A large  
B most largest  
C largest  
D larger  
Answer: C

Question 86
Select the most appropriate option to fill in blank 5.

A choices  
B favourites  
C collections  

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Instructions
For the following questions answer them individually

Question 87
Select the most appropriate option to fill in the blank.
Children under five years are ______ from passport biometrics.

A acquitted
B exempted
C escaped
D allowed

Answer: B

Question 88
Select the word which means the same as the group of words given.
A geometrical figure with eight sides

A Octagon
B Pentagon
C Hexagon
D Heptagon

Answer: A

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Question 89
Select the most appropriate meaning of the given idiom.
Bring to light

A Reveal clearly
B Cheer someone
C Praise in public
D Brighten up

Answer: A

Question 90
Select the most appropriate synonym of the given word.
Fury

A Sin
B Risk
C Anger
D Crime
Answer: C

Question 91
Select the most appropriate meaning of the given idiom.
Hold water
A To be fickle
B To be busy
C To be valid
D To be deep
Answer: C

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Instructions
Select the most appropriate option to substitute the underlined segment in the given sentence. If there is no need to substitute it, select 'No substitution'.

Question 92
Your advice will benefit to me.
A benefit from me
B benefit me
C No substitution
D benefit for me
Answer: B

Question 93
Where you left your bag yesterday?
A No substitution
B Where did you left
C Where were you leaving
D Where did you leave
Answer: D

Instructions
For the following questions answer them individually
Question 94
Select the most appropriate ANTONYM of the given word.
Friendship

A  Enmity
B  Amity
C  Slavery
D  Arrogance
Answer: A

Question 95
Select the correct indirect form of the given sentence.
The lawyer said to me, "There is no proof of your involvement in this case."

A  The lawyer told that there is no proof of my involvement in that case.
B  The lawyer told me that there was no proof of my involvement in that case.
C  The lawyer told me that there is no proof of your involvement in this case.
D  The lawyer said me that there was no proof of my involvement in this case.
Answer: B

Instructions
In the sentence identify the segment which contains the grammatical error.

Question 96
I am believing you have submitted all the necessary documents.

A  I am believing
B  necessary documents
C  you have submitted
D  all the
Answer: A

Question 97
No sooner did we receive your message when we heaved a sigh of relief.

A  did we receive
B  a sigh of relief
C  your message
D  when we heaved
Answer: D
Instructions
For the following questions answer them individually.

Question 98
Given below are four jumbled sentences. Out of the given options pick the one that gives their correct order.
A. Even the most ill-equipped laboratory would have been better than their shed.
B. Thus, they did not allow any difficulties to come in their way.
C. But their mind was set upon the discovery of radium.
D. The Curies had to work in extreme poverty.

A  DACB  
B  ABCD  
C  ADGC  
D  DACB  
Answer: A

Question 99
Select the most appropriate synonym of the given word.
Solitary
A  Singular  
B  Stubborn  
C  Splendid  
D  Sensible  
Answer: A

Question 100
Select the INCORRECTLY spelt word.
A  Deliver  
B  Denial  
C  Decision  
D  Deter  
Answer: A

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