Instructions
For the following questions answer them individually

Question 1
Select the related word/letters/number from the given alternatives.

Fungi: Mycology:: Tissue: ??

A  Haematology
B  Cytology
C  Histology
D  Bacteriology

Answer: C

Explanation:
Mycology is the branch of biology concerned with the study of fungi, similarly histology is the study of tissue.

=> Ans - (C)

Question 2
Select the related word/letters/number from the given alternatives.

BDFH : YWUS :: JLNP : ?

A  QOMK
B  ACEF
C  ZXUT
D  UVWX

Answer: A

Explanation:
Expression = BDFH : YWUS

The pattern followed is that there are as many alphabets to the left of the first letter as there are to the right of the leftmost letter in right hand side

B is the second letter and Y is the second last, D is 4th from left end and W is 4th from right end. F is 6th from left end and U is 5th from right end. Finally, H is 8th from left end and S is 8th from right end in English alphabetical series.

Similarly, for JLNP :
Now, J is 10th from left end, thus first letter will be 10th from right end = Q
L is 12th from left end, second letter will be 12th from right end = O
N is 14th from left end, third letter will be 14th from right end = M
P is 16th from left end, third letter will be 16th from right end = K
Thus, missing term = QOMK

=> Ans - (A)
Question 3
Select the related word/letters/number from the given alternatives.
18 : 30 : : 36 : ?

A 78
B 64
C 66
D 68

Answer: C

Explanation:
Expression = 18 : 30 : : 36 : ?
The pattern followed is = n : 2n – 6
Eg = 18 : 2(18) – 6 = 18 : 30
Similarly, 2(36) – 6 = 72 – 6 = 66
=> Ans - (C)

Question 4
For the following questions
Find out the odd word/letters/number pair from the given alternatives

A Arithmetic
B Mathematics
C Geometry
D Algebra

Answer: B

Explanation:
Arithmetic, Geometry and Algebra are all part of Mathematics, hence it is the odd one out.
=> Ans - (B)

Question 5
For the following questions
Find out the odd word/letters/number pair from the given alternatives

A ACEG
B BDFG
C JLN
D SUWY

Answer: B
Explanation:
(A) : A (+2 letters) = C (+2 letters) = E (+2 letters) = G
(B) : B (+2 letters) = D (+2 letters) = F (+1 letter) = G
(C) : J (+2 letters) = L (+2 letters) = N (+2 letters) = P
(D) : S (+2 letters) = U (+2 letters) = W (+2 letters) = Y
=> Ans - (B)

Question 6
For the following questions
Find out the odd word/letters/number pair from the given alternatives

A 16, 32
B 20, 40
C 64, 81
D 81, 162

Answer: C

Explanation:
Ratio of each pair :
(A) : \(\frac{32}{16} = 2\)
(B) : \(\frac{40}{20} = 2\)
(C) : \(\frac{81}{64} = 1.2\)
(D) : \(\frac{162}{81} = 2\)
=> Ans - (C)

Question 7
Arrange the following words as per order in the dictionary
1. Weather
2. Weasand
3. Wealth
4. Weapon
5. Weekend

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

Answer: C

Explanation:
As per order in the dictionary
= Wealth -> Weapon -> Weasand -> Weather -> Weekend
≡ 3,4,2,1,5
=> Ans - (C)
Question 8
Choose the correct alternative from the given ones that will complete the series

BFK, KOT, UYD,?

A  BFJ
B  ADG
C  FJO
D  PSX

Answer: C

Explanation:
Expression : BFK, KOT, UYD,?
The pattern is same for each letter in the terms which is :
1st letter : B (+9 letters) = K (+10 letters) = U (+11 letters) = F
2nd letter : F (+9 letters) = O (+10 letters) = Y (+11 letters) = J
3rd letter : K (+9 letters) = T (+10 letters) = D (+11 letters) = O
Thus, missing term = FJO
=> Ans - (C)

Question 9
Find the missing number in the series

2, 3, 8, ?, 112, 565

A  565
B  112
C  27
D  8

Answer: C

Explanation:
The pattern followed is :

\[ 2 \times 1 + 1 = 3 \]
\[ 3 \times 2 + 2 = 8 \]
\[ 8 \times 3 + 3 = 27 \]
\[ 27 \times 4 + 4 = 112 \]
\[ 112 \times 5 + 5 = 565 \]

=> Ans - (C)

Question 10
A woman pointing to a man said, "He is the widower of my uncle's brother's daughter." How is the man related to the woman?

A  Brother-in-law
B  Brother
C  Uncle
D  Nephew

Answer: A

Explanation:
The woman's uncle's brother is that woman's father.
Now, her father's daughter is her sister.
Also, that man was married to that woman's sister, thus he's her brother-in-law.
=> Ans - (A)

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Question 11
P, Q, R and S are four friends. P is shorter than Q but taller than R who is shorter than S. Who is the shortest among all?

A  P  B  Q  C  R  D  S

Answer: C

Explanation:
P is shorter than Q but taller than R, => Q > P > R
Also, R is shorter than S, => S > R
Combining above statements, R is the shortest.
=> Ans - (C)

Question 12
From the given alternative words, select the word which cannot be formed using the letter of the given word.

IMPRACTICABLE

A  CAPABLE  B  PARTICLE  C  PRACTICAL  D  PEACE

Answer: D

Explanation:
The word IMPRACTICABLE does not contain 2 E's, thus the word 'Peace' cannot be formed.
=> Ans - (D)

Question 13
If BROTHER is coded as GWTYMJW, then SCHOOL is coded as
A  WGLSSP
B  WGLSSQ
C  XHMTTQ
D  XHMTTP

Answer: C

Explanation:
BROTHER is coded as GWTYMJW
The pattern followed is:

<table>
<thead>
<tr>
<th>B</th>
<th>R</th>
<th>O</th>
<th>T</th>
<th>H</th>
<th>E</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+5)</td>
<td>(+5)</td>
<td>(+5)</td>
<td>(+5)</td>
<td>(+5)</td>
<td>(+5)</td>
<td>(+5)</td>
</tr>
<tr>
<td>G</td>
<td>W</td>
<td>T</td>
<td>Y</td>
<td>M</td>
<td>J</td>
<td>W</td>
</tr>
</tbody>
</table>

Similarly, for SCHOOL:

<table>
<thead>
<tr>
<th>S</th>
<th>C</th>
<th>H</th>
<th>O</th>
<th>G</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+5)</td>
<td>(+5)</td>
<td>(+5)</td>
<td>(+5)</td>
<td>(+5)</td>
<td>(+5)</td>
</tr>
<tr>
<td>X</td>
<td>H</td>
<td>M</td>
<td>T</td>
<td>T</td>
<td>Q</td>
</tr>
</tbody>
</table>

=> Ans - (C)

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Question 14
If ‘‘’ means subtraction, ‘+’ means addition, ‘×’ means multiplication and ‘>’ means division, then find the value of the given statement,
The value of $9 \div 7 < 8 > (4>2) + 5$ will be

A  32
B  18
C  16
D  11

Answer: A

Explanation:
Expression: $9 \div 7 < 8 > (4>2) + 5$
$\equiv 9 + 7 \times 8 \div (4 \div 2) - 5$
$= 9 + \frac{56}{2} - 5$
$= 4 + 28 = 32$
=> Ans - (A)

Question 15
If $5 \times 3 = 19$ and $8 \times 5 = 49$, then what should $6 \times 4$ be?

A  24
B  28
C  18

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D 16

Answer: B

Explanation:
The pattern followed is that $a \times b = a \times b + (a - b)^2$

Eg: $5 \times 3 = 5 \times 3 + (5 - 3)^2 = 15 + 4 = 19$
and $8 \times 5 = 8 \times 5 + (8 - 5)^2 = 40 + 9 = 49$

Similarly, $6 \times 4 = 6 \times 4 + (6 - 4)^2 = 24 + 4 = 28$

=> Ans - (B)

Question 16
Select the missing number from the given responses.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>20</td>
<td>36</td>
</tr>
<tr>
<td>15</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>55</td>
<td>40</td>
<td>?</td>
</tr>
</tbody>
</table>

A 45
B 65
C 70
D 80

Answer: B

Explanation:
In each row, the first two numbers are added and twice the difference is subtracted to obtained the third number.

Eg: $24 + 20 - 2(24 - 20) = 44 - 8 = 36$
and $15 + 11 - 2(15 - 11) = 26 - 8 = 18$

Similarly, $55 + 40 - 2(55 - 40) = 95 - 30 = 65$

=> Ans - (B)

Question 17
A man walks 7 km towards south and turns to the left. After walking 5 km, he turns to the right and walks 7 km. In which direction is he now from the starting point?

A West
B South
C South-East
D North-East

Answer: C

Explanation:
Let the man starts from point A, he walks 7 km south, then he turns left and walks towards east for 5 km and reaches point C. Finally, he turns right and walks towards south and reaches point D.

Thus, he is at south-east position from his initial position.

=> Ans - (C)

Question 18
Consider the given statement/s to be true and decide which of the given conclusions/assumptions can definitely be drawn from the given statement.

Statement 1: When water is cooled, it turns into ice.
Statement 2: When water is heated, it turns into steam.

Conclusion I: Water is a solid.
Conclusion II: Water is a gas.

A Only Conclusion I follows
B Only Conclusion II follows
C Both I and II follow
D Neither I nor II follows

Answer: D

Explanation:
When water is cooled, it turns into ice, this does not indicate that water is solid, and thus first conclusion does not follow.
When water is heated, it turns into steam, this does not indicate that water is gas, and thus second conclusion does not follow.

=> Ans - (D)

Question 19
What is total number of triangles in the given figure?

A 16
B 32
C 40
D 12
Answer: D

Explanation:
Small triangles = 6
Triangles made by combining 2 small triangles = 2
Triangles made by combining 3 small triangles = 4
So, total = 6 + 2 + 4 = 12
=> Ans - (D)

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Question 20
Identify the diagram that best represents the relationship among classes given below
Men, Rodents and living beings

Answer: C

Explanation:
Rodents and men both come under the category of living beings but are completely different from each other. Thus, the third figure best describes above relationship.
=> Ans - (C)
Question 21
Which answer figure will complete the pattern in the figure?

A

B

C

D

Answer: D

Explanation:
The bottom right part of the square is missing and there are no diagonals in that part, thus first and third options are eliminated.
Also, there are two circles in the middle, thus second option is also not possible.

=> Ans - (D)

Question 22

From the given answer figures, select the one in which the figure is hidden/embedded.
Answer: A

Explanation:
The question figure is embedded in the following figure:

=> Ans - (A)

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Question 23
A piece of paper is folded and cut as shown below in the figures. From the given answer figures, indicate how it will appear when opened.

Answer: A
Question 24
If a mirror is placed on the line MN, then which of the answer figure is the right image?
Explanation:
A vertical mirror is placed, so the object at the left will appear at the right and vice-versa. The arrow in the middle initially pointing right will now point left hand side, thus first and third options are eliminated.
Also, the direction of horizontal lines on either side of the arrow will also change, and thus second option is invalid.

=> Ans - (D)

Question 25
In the question, a word is represented by only one set of numbers as given in any one of the alternatives. The sets of numbers given in the alternatives are represented by two classes of alphabets as in two matrices given below. The columns and rows of Matrix I are numbered from 0 to 4 and that of Matrix II are numbered from 5 to 9. A from these matrices can be represented first by its row and next by its column. e.g. N can be represented by 01, 14 etc. and A can be represented by 55, 69, etc. You have to identify the set for the word ‘GOOD’.

<table>
<thead>
<tr>
<th>Matrix - I</th>
<th>Matrix - II</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 B N G L D</td>
<td>5 A I K O R</td>
</tr>
<tr>
<td>1 G L D B N</td>
<td>6 I K O R A</td>
</tr>
<tr>
<td>2 D B N G L</td>
<td>7 K O R A I</td>
</tr>
<tr>
<td>3 N G L D B</td>
<td>8 O R A I K</td>
</tr>
<tr>
<td>4 L D B N G</td>
<td>9 R A I K O</td>
</tr>
</tbody>
</table>
A  02, 58, 68, 04  
B  44, 99, 76, 20  
C  31, 67, 76, 22  
D  33, 76, 86, 41  

**Answer:** B  

**Explanation:**  
(A) : 02, 58, 68, 04 = GORD  
(B) : 44, 99, 76, 20 = GOOD  
(C) : 31, 67, 76, 22 = GOON  
(D) : 33, 76, 86, 41 = DORD  

=> Ans - (B)

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**General Awareness**

**Instructions**
For the following questions answer them individually.

**Question 26**
Which state has the lowest birth rate in India ?

A  Kerala  
B  Uttar Pradesh  
C  Bihar  
D  West Bengal  

**Answer:** A

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**Question 27**
The Secretariat of SAARC is set up at ____________

A  Washington  
B  Kathmandu  
C  Hague  
D  New Delhi  

**Answer:** B

**Question 28**
The outermost range of Himalays is called__________

A  Kali
Question 29
Who is generally considered to be the father of the Indian Renaissance?

A Rabindranath Tagore
B Raja Rammohan Roy
C Mahatma Phule
D M.G. Ranade

Answer: B

Question 30
The longest river of peninsular India is________

A Narmada
B Godavari
C Mahanadi
D Cauvery

Answer: B

Question 31
Which element gives hardness to stainless steel?

A Zinc
B Lead
C Carbon
D Tin

Answer: C

Question 32
Which of the following is responsible for transport of food and other substances in plants?

A Xylem
B Phloem
C Chloroplast
None of these
Answer: B

Question 33
The washing machine works on the principle of ____________
A Dialysis
B Diffusion
C Reverse osmosis
D Centrifugation
Answer: D

Question 34
Which is not an external storage device?
A CD-ROM
B DVD-ROM
C Pen Drive
D RAM
Answer: D

Question 35
Which of the following is the correct description of the term sex-ratio as used in the context of the census of population?
A Number of males per 1000 females.
B Number of females per 1000 males.
C Number of females per 100 males.
D Number of females in a sample of 1000 persons.
Answer: B

Question 36
The atomic power station in Rajasthan is situated at:
A Pokhran
B Suratgarh
C Rawatbhata
D Chittorgarh
Question 37
The Sahitya Akademi Awards are given for best writings in how many Indian languages?

A 12
B 15
C 20
D 24
Answer: D

Question 38
Right to Privacy comes under__________

A Article 19
B Article 20
C Article 21
D Article 18
Answer: C

Question 39
The foreign traveller who visited India during the reign of Shahjahan was__________

A Thomas Roe
B William Hawkins
C Ibn Batuta
D Manucci
Answer: D

Question 40
The GST (Goods and Services Tax), recently passed by Government will be levied on which of the following products?

A Petroleum Crude
B Tobacco
C Natural Gas
D Aviation Turbine Fuel
Answer: B
Question 41
Who was elected the Prime Minister of Nepal recently?

A  Keshav Kumar Budhathoki
B  Khadga Prasad Sharma Koli
C  Sushil Koirala
D  Pushpakamal Dahal 'Prachanda'

Answer: D

Question 42
Which lobe of human brain is associated with hearing?

A  Frontal lobe
B  Parietal lobe
C  Temporal lobe
D  Occipital lobe

Answer: C

Question 43
Which of the following is not soluble in water?

A  Lead sulphate
B  Zinc sulphate
C  Potassium sulphate
D  Sodium sulphate

Answer: A

Question 44
Activated Charcoal is used to remove colouring matter from pure substances by_______

A  Bleaching
B  Oxidation
C  Adsorption
D  Reduction

Answer: C

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Question 45
Chernobyl disaster is the result of pollution by_________.

A Oil spill
B Acid rain
C Carbon dioxide
D Radioactive waste

Answer: D

Question 46
Which of the following caused radioactive pollution along the coast of Kerala?

A Plutonium
B Zinc
C Thorium
D Radium

Answer: C

Question 47
In mammals, an important role of excretion is played by_____.

A Large intestine
B Kidneys
C Lungs
D Liver

Answer: B

Question 48
The second Green Revolution aims at increasing agricultural output to promote

A Availability of easy credit to big farmers
B Co-operative farming
C Inclusive growth
D Development of rural sector

Answer: C

Question 49
Which of the following causes rainfall during winters in the north-western part of India?
Western disturbances
Cyclonic depression
Southwest monsoon
Retreating monsoon

Answer: A

Question 50
The 'Blue Water Policy' was introduced by the Portuguese leader

A Francisco de Almeida
B Alfonso de Albuquerque
C Francis Caron
D Francis Martin

Answer: A

Instructions
For the following questions answer them individually

Question 51
If the sum of a number and its reciprocal be 2, then the number is

A 0
B 1
C -1
D 2

Answer: B

Explanation:
Let the number be $x$

$=> x + \frac{1}{x} = 2$

$=> x^2 + 1 = 2x$

$=> x^2 - 2x + 1 = 0$

$=> (x - 1)^2 = 0$

$=> x - 1 = 0$

$=> x = 1$

$=> \text{Ans} - (B)$
Question 52
The area of a rectangle in 60 cm² and its perimeter is 34 cm, then the length of the diagonal is

A 17cm  
B 11cm  
C 15cm  
D 13cm  

Answer: D

Explanation:
Let the length and breadth of rectangle be \( l \) and \( b \) cm respectively

=> Diagonal = \( d = \sqrt{l^2 + b^2} \) cm

Area of rectangle = \( lb = 60 \) \( \text{(i)} \)

Perimeter of rectangle = \( 2(l + b) = 34 \)

=> \( l + b = \frac{34}{2} = 17 \)

Squaring both sides,

=> \( (l + b)^2 = (17)^2 \)

=> \( l^2 + b^2 + 2lb = 289 \)

=> \( l^2 + b^2 + 2(60) = 289 \) \[Using (i)\]

=> \( l^2 + b^2 = 289 - 120 = 169 \)

=> \( \sqrt{l^2 + b^2} = \sqrt{169} \)

=> \( d = 13 \) cm

=> Ans - (D)

Question 53
A cloth merchant has announced 25% rebate in prices. If one needs to have a rebate of ₹ 40, then how many metres of cloth costing ₹ 32 per metre he should purchase.

A 6m  
B 5m  
C 10m  
D 7m  

Answer: B

Explanation:
Cost of 1 m of cloth = ₹ 32

Discount on 1 shirt = \( \frac{25}{100} \times 32 = Rs. 8 \)

=> Quantity of cloth one should buy to have a rebate of ₹ 40 = \( \frac{40}{8} = 5 \) m

=> Ans - (B)

Question 54
A profit of Rs. 960 is divided between A and B in the ratio 1/3:1/2. The difference of their profit is:
A Rs.120
B Rs.160
C Rs.180
D Rs.192

Answer: D

Explanation:
Ratio of profit between A : B = \( \frac{1}{3} : \frac{1}{2} \)
= 2 : 3
Let A received = Rs. 2x and B received = Rs. 3x
Total amount = 2x + 3x = 960
=> \( x = \frac{960}{5} = 192 \)

\( \therefore \) Difference of their profit = 3x - 2x = x = Rs. 192
=> Ans - (D)

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Question 55
The average monthly salary of 19 members of a group is Rs. 16000. If one more member whose monthly salary is Rs. 20000 has joined the group, then the average salary of the group is

A Rs.18250
B Rs.16200
C Rs.18000
D Rs.16250

Answer: B

Explanation:
Average monthly salary of 19 members of a group = Rs. 16,000
=> Total monthly salary of 19 members = 16,000 \times 19 = Rs. 304,000

Salary of new member = Rs. 20,000
=> Total salary of 20 members = 304,000 + 20,000 = Rs. 324,000

\( \therefore \) Average salary of the group = \( \frac{324,000}{20} = Rs. 16,200 \)
=> Ans - (B)

Question 56
A T.V was sold at a profit of 5% If it had been sold at a profit of 10% , the profit would have been Rs. 1000 more. What is its cost price?

A Rs.20000
B Rs.5000
C Rs.10000
D  Rs.15000
Answer: A

Explanation:
Let the cost price of the TV = Rs. 100x
If profit % = 5%
=> Profit = \( \frac{5}{100} \times 100x = Rs. 5x \)
Similarly, if profit % = 10%, profit = Rs. 10x
According to ques,
=> 10x - 5x = 1000
=> 5x = 1000
=> x = \( \frac{1000}{5} \) = 200
∴ Cost price = 100 \times 200 = Rs. 20,000
=> Ans - (A)

Question 57
The price of an article is decreased by 10%. To restore it to its former value, the new price must be increased by:

A  \( \frac{1}{9} \)11 %
B  10 %
C  11 %
D  11\frac{1}{9} %
Answer: D

Explanation:
Let the original price of the article = Rs. 100
If the price is cut by 10%, => New price = \( \frac{100-10}{100} \times 100 = Rs.90 \)
To restore to its original value the new price must be increased by \( \frac{100-90}{90} \times 100 \)
= \( \frac{100}{9} \) = 11\frac{1}{9} %
=> Ans - (D)

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Question 58
A moving train passes a platform 50m long in 14 seconds and a lamp post in 10 seconds. The speed of the train (in km/h) is:

A  24
B  36
C  40
D  45
Answer: D

Explanation:
Let the speed of train = \( s \) m/sec and length of train = \( l \) m

Using, time = distance/speed

The train passes a lamp post in 10 seconds

\[ \Rightarrow 10 = \frac{l}{s} \]

\[ \Rightarrow l = 10s \quad (i) \]

Similarly, \[ 14 = \frac{50+l}{s} \]

\[ \Rightarrow 14s = 50 + 10s \quad [\text{Using (i)}] \]

\[ \Rightarrow 14s - 10s = 4s = 50 \]

\[ \Rightarrow s = \frac{50}{4} = 12.5 \text{ m/sec} \]

\[ \therefore \text{Speed of train (in km/hr) = } \frac{18}{5} \times 12.5 = 45 \text{ km/hr} \]

\[ \Rightarrow \text{Ans - (D)} \]

**Question 59**

If \( x^2 + \frac{1}{x^2} = 2 \), then the value of \( x - \frac{1}{x} \) is

A -2

B 0

C 1

D -1

**Answer:** B

**Explanation:**

Given : \( x^2 + \frac{1}{x^2} = 2 \) \quad (i)

Now, \( (x - \frac{1}{x})^2 = x^2 + \frac{1}{x^2} - 2(x)(\frac{1}{x}) \)

\[ \Rightarrow (x - \frac{1}{x})^2 = 2 - 2 \quad [\text{Using (i)}] \]

\[ \Rightarrow x - \frac{1}{x} = 0 \]

\[ \Rightarrow \text{Ans - (B)} \]

**Question 60**

If \( pq(p + q) = 1 \), then the value of \( p^3q^3 - p^3 - q^3 \) is equal to

A 1

B 2

C 3

D 4

**Answer:** C

**Explanation:**

Given : \( pq(p + q) = 1 \)

\[ \Rightarrow p + q = \frac{1}{pq} \quad (i) \]

Cubing both sides
\[ (p + q)^3 = \left(\frac{1}{p}q\right)^3 \]
\[ p^3 + q^3 + 3pq(p + q) = \frac{1}{p^3}q^3 \]
\[ p^3 + q^3 + 3pq\left(\frac{1}{p}q\right) = \frac{1}{p^3}q^3 \quad \text{[Using (i)]} \]
\[ p\frac{1}{p^3} - p^3 - q^3 = 3 \]
\[ \Rightarrow \text{Ans} - (C) \]

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**Question 61**
An angle in a semicircle is

A. 45°
B. 60°

**Answer:** B

**Explanation:**

\[\triangle OBC\]

Given : \( AB = 16 \text{ cm} \) and \( OB = 10 \text{ cm} \)

To find : \( OC = ? \)

Solution : The line from the centre of the circle to the chord bisects it at right angle.

\[ \Rightarrow AC = BC = \frac{1}{2} \cdot AB \]
\[ \Rightarrow BC = \frac{16}{2} = 8 \text{ cm} \]

In \( \triangle OBC \),

\[ (OC)^2 = (OB)^2 - (BC)^2 \]
\[ (OC)^2 = (10)^2 - (8)^2 \]
\[ (OC)^2 = 100 - 64 = 36 \]
\[ OC = \sqrt{36} = 6 \text{ cm} \]
\[ \Rightarrow \text{Ans} - (B) \]

**Question 62**
A chord of length 16 cm is drawn in a circle of radius 10 cm. The distance of the chord from the centre of the circle is

A. 8 cm
B. 6 cm
C. 4 cm
D. 12 cm

**Answer:** B

**Explanation:**

\[\triangle OCB\]

Given : \( AB = 16 \text{ cm} \) and \( OB = 10 \text{ cm} \)

To find : \( OC = ? \)

Solution : The line from the centre of the circle to the chord bisects it at right angle.

\[ \Rightarrow AC = BC = \frac{1}{2} \cdot AB \]
\[ \Rightarrow BC = \frac{16}{2} = 8 \text{ cm} \]

In \( \triangle OCB \),

\[ (OC)^2 = (OB)^2 - (BC)^2 \]
\[ (OC)^2 = (10)^2 - (8)^2 \]
\[ (OC)^2 = 100 - 64 = 36 \]
\[ OC = \sqrt{36} = 6 \text{ cm} \]
\[ \Rightarrow \text{Ans} - (B) \]
$\angle BOC = 180^\circ$

The angle subtended by an arc at the centre of the circle is double the angle subtended by it at any point on the circle.

$\Rightarrow \angle BOC = 2 \times \angle BAC$

$\Rightarrow \angle BAC = \frac{180}{2} = 90^\circ$

$\Rightarrow$ Ans - (C)

Question 63

If $x = a \cos \theta + b \sin \theta$ and $y = b \cos \theta - a \sin \theta$, then $x^2 + y^2$ is equal to

A  $ab$

B  $a^2 + b^2$

C  $a^2 - b^2$

D  1

Answer: B

Explanation:

Expression 1: $x = a \cos \theta + b \sin \theta$

Squaring both sides

$\Rightarrow x^2 = a^2 \cos^2 \theta + b^2 \sin^2 \theta + 2ab \sin \theta \cos \theta$  \(\text{(i)}\)

Expression 2: $y = b \cos \theta - a \sin \theta$

Squaring both sides,

$\Rightarrow y^2 = b^2 \cos^2 \theta + a^2 \sin^2 \theta - 2ab \sin \theta \cos \theta$  \(\text{(ii)}\)

Adding equations (i) and (ii), we get:

$\Rightarrow x^2 + y^2 = [a^2 \cos^2 \theta + b^2 \cos^2 \theta + 2ab \sin \theta \cos \theta] + [a^2 \sin^2 \theta + b^2 \sin^2 \theta - 2ab \sin \theta \cos \theta]$

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

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

$= a^2 + b^2$

$\Rightarrow$ Ans - (B)
Question 64
A can do a work in 12 days while B can do it in 15 days. They undertake to complete it together for Rs. 450. what will be the share of A in this amount of money?

A Rs.200
B Rs.240
C Rs.250
D Rs.300

Answer: C

Explanation:
Let total work to be done = 60 units
A can do the work in 12 days.
=> A’s efficiency = \(\frac{60}{12} = 5\) units/day
Similarly, B’s efficiency = \(\frac{60}{15} = 4\) units/day
Total amount = Rs. 450
:. A’s share of money = \(5 \times 50 = Rs. 250\)
=> Ans - (C)

Question 65
If \(x = \sqrt{2} + 1\), then the value of \(x^4 - \frac{1}{x^4}\) is

A \(8\sqrt{2}\)
B \(18\sqrt{2}\)
C \(6\sqrt{2}\)
D \(24\sqrt{2}\)

Answer: D

Explanation:
Given : \(x = \sqrt{2} + 1\)
=> \(x^2 = (\sqrt{2} + 1)^2\)
=> \(x^2 = 2 + 1 + 2\sqrt{2}\)
=> \(x^2 = 3 + 2\sqrt{2}\)

Squaring both sides, => \(x^4 = 9 + 8 + 2(3)(2\sqrt{2})\)
=> \(x^4 = 17 + 12\sqrt{2}\) \(\text{(i)}\)

\(\frac{1}{x^4} = \frac{1}{17 + 12\sqrt{2}}\)

\(\frac{1}{x^4} = \frac{1}{17 + 12\sqrt{2}} \times \frac{(17 - 12\sqrt{2})}{(17 - 12\sqrt{2})}\)

\(\frac{1}{x^4} = \frac{17 - 12\sqrt{2}}{(17 - 12\sqrt{2})^2}\)
Subtracting equation (ii) from (i)

\[ x^4 - x^4 = (17 + 12\sqrt{2}) - (17 - 12\sqrt{2}) \]

\[ = 12\sqrt{2} + 12\sqrt{2} = 24\sqrt{2} \]

\[ \Rightarrow \text{Ans} - (D) \]

**Question 66**

If \(9x^2 + 16y^2 = 60\) and \(3x + 4y = 6\), then the value of \(xy\) is

A -1

B 1

C -2

D 2

**Answer:** A

**Explanation:**

Given: \(9x^2 + 16y^2 = 60 \) \(-\) -(i)

and \(3x + 4y = 6\)

Squaring both sides, we get:

\[ (3x + 4y)^2 = (6)^2 \]

\[ \Rightarrow 9x^2 + 16y^2 + 2(3x)(4y) = 36 \]

\[ \Rightarrow 60 + 24xy = 36 \quad \text{[Using (i)]} \]

\[ \Rightarrow 24xy = 36 - 60 = -24 \]

\[ \Rightarrow xy = \frac{-24}{24} = -1 \]

\[ \Rightarrow \text{Ans} - (A) \]

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**Question 67**

If in \(\Delta ABC\), \(DE || BC\), \(AB = 7.5\) cm, \(BD = 6\) cm and \(DE = 2\) cm, then the length of \(BC\) in cm is:

A 6

B 8

C 10

D 10.5

**Answer:** C

**Explanation:**
Given: AB = 7.5 cm and BD = 6 cm

=> AD = AB - DB = 1.5 cm

To find: BC = ?

Solution: DE is parallel to BC

=> \( \frac{AD}{AB} = \frac{DE}{BC} \)

=> \( \frac{1.5}{7.5} = \frac{2}{BC} \)

=> \( \frac{1}{5} = \frac{2}{BC} \)

=> \( BC = 2 \times 5 = 10 \text{ cm} \)

=> Ans - (C)

Question 68

Suppose that the medians BD, CE and AF of a triangle ABC meet at G. Then AG: GF is

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

Answer: B

Explanation:

Given: BD, CE and AF are medians of triangle ABC and G is the centroid.

To find: AG: GF = ?

Solution: In a triangle, a centroid divides the median in the ratio 2 : 1

=> \( \frac{AG}{BG} = \frac{CG}{GD} = \frac{GE}{GE} = 2 \)

=> \( GF = GD = GE = 1 \)

=> Ans - (B)

Question 69

If \( \frac{\cos \theta}{1 - \sin \theta} + \frac{\cos \theta}{1 + \sin \theta} = 4 \) then the value of \( \theta(0 < \theta < 90^\circ) \) is
A 60°
B 45°
C 30°
D 35°

Answer: A

Explanation:
Given:
\[ \cos \theta + \cos \theta \sin \theta = 4 \]

=> \[ \frac{\cos \theta (1 + \sin \theta) + \cos \theta (1 - \sin \theta)}{(1 - \sin \theta)(1 + \sin \theta)} = 4 \]

=> \[ (\cos \theta + \cos \theta \sin \theta) + (\cos \theta - \cos \theta \sin \theta) = 4(1 - \sin^2 \theta) \]

=> \[ 2 \cos \theta = 4 \cos^2 \theta \]

=> \[ 2 \cos \theta = 1 \]

=> \[ \cos \theta = \frac{1}{2} \]

=> \[ \theta = \cos^{-1} \left( \frac{1}{2} \right) \]

=> \[ \theta = 60° \]

=> Ans - (A)

General Science Notes for SSC CGL

Question 70

A sum of Rs. 2000 amounts to Rs. 4000 in two years at compound interest. In how many years does the same amount becomes Rs. 8000.

A 2
B 4
C 6
D 8

Answer: B

Explanation:
Let the rate of interest = \( r \)%

Principal = Rs. 2000 and time = 2 years

Amount under compound interest = \( P(1 + \frac{r}{100})^t \)

=> \[ 2000(1 + \frac{r}{100})^2 = 4000 \]

=> \[ (1 + \frac{r}{100})^2 = \frac{4000}{2000} = 2 \]

=> \[ (1 + \frac{r}{100}) = \sqrt{2} \] (i)

Let the sum amounted to Rs. 8000 in \( t \) years

=> \[ 2000(1 + \frac{r}{100})^t = 8000 \]

Substituting value from equation (i)

=> \[ (\sqrt{2})^t = \frac{8000}{2000} = 4 \]

Answer: B
Question 71

Two ships are sailing in the sea on the two sides of a light house. The angle of elevation of the top of the light house as observed from the two ships are 30° and 45° respectively. If the light house is 100m high, the distance between the two ships is : (take $\sqrt{3} = 1.73$)

A 173m
B 200m
C 273m
D 300m

Answer: C

Explanation:

Given : AD is the lighthouse = 100 m
To find : Distance between the ships = BC = ?

Solution : In $\triangle$ ADC

$\Rightarrow tan(30^\circ) = \frac{AD}{DC}$

$\Rightarrow \frac{1}{\sqrt{3}} = \frac{100}{DC}$

$\Rightarrow DC = 100\sqrt{3}$

$\Rightarrow DC = 100 \times 1.73 = 173 m$

Similarly, in $\triangle$ ABD

$\Rightarrow tan(45^\circ) = \frac{AD}{DB}$

$\Rightarrow 1 = \frac{100}{DB}$

$\Rightarrow DB = 100 m$

$\therefore$ BC = BD + DC

$= 100 + 173 = 273 m$

$\Rightarrow$ Ans - (C)
Question 72
The percent increase in the number of students admitted in the year 2003 over that in 2001 is

A 133.3
B 33.3
C 40.3
D 66.7

Answer: B

Explanation:
Number of students admitted in the year 2003 (in thousands) = 12
Number of students admitted in the year 2001 (in thousands) = 9

=> Required % increase = \( \frac{12-9}{9} \times 100 \)

= \( \frac{100}{3} \) = 33.3%

=> Ans - (B)

Question 73
During 2000 to 2003, the ratio of the total number of the students passed out to the total number of students admitted is

A 17/23
B 17/6
C 11/23
D 5/7

Answer: D

Explanation:
During 2000 to 2003,
Total number of the students passed out (in thousands) = 4+6+6+9 = 25
Total number of students admitted (in thousands) = 6+9+8+12 = 35

=> Required ratio = \( \frac{25}{35} = \frac{5}{7} \)
Question 74
In which of the two years, the pass percentage of students was between 60 to 70?

A 2000 and 2001  
B 2003 and 2004  
C 2001 and 2002  
D none of these

Answer: A

Explanation:
Pass percentage of the students in:
2000: $\frac{4}{6} \times 100 = 66.67\%$
2001: $\frac{6}{9} \times 100 = 66.67\%$
2002: $\frac{8}{6} \times 100 = 75\%$
2003: $\frac{12}{9} \times 100 = 75\%$
2004: $\frac{11.5}{9} \times 100 = 78.2\%$

=> Only in 2000 and 2001 the pass percentage of students was between 60 to 70.

=> Ans - (A)

Question 75
The ratio of the number of students admitted in the year 2002 to the average of the number of students passed out in the years 2003 and 2004, is

A 7:8  
B 8:9  
C 9:8  
D 8:7

Answer: B

Explanation:
Number of students admitted in the year 2002 = 8000
Total number of students passed out in the years 2003 and 2004 = 9000 + 9000 = 18000.
Average number of students passed out in the years 2003 and 2004 = $\frac{18000}{2} = 9000$

=> Required ratio = $\frac{8000}{9000} = \frac{8}{9}$

=> Ans - (B)
Question 76
In the following question, out of the four alternatives, choose the word which best expresses the meaning of the given word and click the button corresponding to it.

REVILE

A REVIVE
B REVIEW
C ABUSE
D REVEAL

Answer: C

Question 77
In the following question, out of the four alternatives, choose the word which is opposite in meaning to the given word and click the button corresponding to it.

SQUANDER

A SPEND
B REDUCE
C SLANDER
D SKIMP

Answer: D

Question 78
Four words are given, out of which only one word is spelt correctly. Choose the correctly spelt word and click the button corresponding to it.

A Sanctaries
B Sanctauries
C Santuaries
D Sanctuaries

Answer: D

Question 79
In the following questions, one part of the sentence may have an error. Find out which part of the sentence has an error and click the button corresponding to it. If the sentence is free from error, click the “No error” option.

He had already sent me message (a) / that his arrival (b) / was scheduled for Thursday (c) / No error (d)

A He had already sent me message
B that his arrival
C was scheduled for Thursday
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Question 80
In the following questions, one part of the sentence may have an error. Find out which part of the sentence has an error and click the button corresponding to it. If the sentence is free from error, click the "No error" option.

Science and technology and (a) / their fallouts do not (b) / complete human culture (c) / No error (d)

A Science and technology and
B their fallouts do not
C complete human culture
D No error
Answer: B

Question 81
In the following questions, one part of the sentence may have an error. Find out which part of the sentence has an error and click the button corresponding to it. If the sentence is free from error, click the "No error" option.

The angry bird flap (a) / her wings, flies a short (b) / distance and returns. (c) / No error (d)

A The angry bird flap
B her wings, flies a short
C distance and returns
D No error
Answer: A

Question 82
The sentences given with blanks are to be filled with an appropriate word(s). Four alternatives are suggested for each question. For each question, choose the correct alternative and click the button corresponding to it.

The clock has ________ for want of winding.

A run down
B run short
C run past
D run up
Answer: A
Question 83
The sentences given with blanks are to be filled with an appropriate word(s). Four alternatives are suggested for each question. For each question, choose the correct alternative and click the button corresponding to it.

Few people know that flowers use textures to _______ different kinds of insects.

A signal  
B feel  
C attract  
D distract  
Answer: C

Question 84
The sentences given with blanks are to be filled with an appropriate word(s). Four alternatives are suggested for each question. For each question, choose the correct alternative and click the button corresponding to it.

They abandoned their comrades _______ the wolves.

A by  
B between  
C on  
D among  
Answer: D

Question 85
In each of the questions, four alternatives are given for the Idiom/Phrase. Choose the alternative which best expresses the meaning of the Idiom/Phrase and click the button corresponding to it.

For keeps

A Himself  
B Away  
C Forever  
D Hid  
Answer: C

Question 86
In each of the questions, four alternatives are given for the Idiom/Phrase. Choose the alternative which best expresses the meaning of the Idiom/Phrase and click the button corresponding to it.

Pale into insignificance

A Seemed less important  
B Was less exciting  

Question 87
In each of the questions, four alternatives are given for the Idiom/Phrase. Choose the alternative which best expresses the meaning of the Idiom/Phrase and click the button corresponding to it.

With one voice

A  By one man
B  By one community
C  Unanimously
D  In disharmony

Answer: C

Question 88
Out of the four alternatives, choose the one which can be substituted for the given words/sentences and click the button corresponding to it.

Drug which causes people to sleep easily

A  Poppy
B  Soporific
C  Beguile
D  Pedant

Answer: B

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Question 89
Out of the four alternatives, choose the one which can be substituted for the given words/sentences and click the button corresponding to it.

The branch of philosophy concerned with the study of the principles of beauty, especially in art

A  Artistic
B  Aesthetics
C  Ethics
D  Metaphysics

Answer: B
Question 90
Out of the four alternatives, choose the one which can be substituted for the given words/sentences and click the button corresponding to it.
The study of skin
A Dermatology
B Dermatoglyphics
C Stratigraphy
D Oncology
Answer: A

Question 91
A sentence/a part of the sentence is underlined. Four alternatives are given to the underlined part which will improve the sentence. Choose the correct alternative and click the button corresponding to it. In case no improvement is needed, click the button corresponding to “No improvement”.
She has that rare character - the ability to listen to people.
A rare ear
B rare characteristic
C rare sense
D No improvement
Answer: D
Explanation:
The given sentence has no error and hence no improvement is required.

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Question 92
A sentence/a part of the sentence is underlined. Four alternatives are given to the underlined part which will improve the sentence. Choose the correct alternative and click the button corresponding to it. In case no improvement is needed, click the button corresponding to “No improvement”.
Both of them have not apologized yet.
A Neither of them has
B Any of them have
C None of the two
D No improvement
Answer: A

Question 93
A sentence/a part of the sentence is underlined. Four alternatives are given to the underlined part which will improve the sentence. Choose the correct alternative and click the button corresponding to it. In case no improvement is needed, click the button corresponding to “No improvement”.
The greater the demand, higher the price.
A sentence/a part of the sentence is underlined. Four alternatives are given to the underlined part which will improve the sentence. Choose the correct alternative and click the button corresponding to it. In case no improvement is needed, click the button corresponding to "No improvement".

His appointment as coach is yet another feather in his wing.

A feather in his hat  
B badge in his hat  
C feather in his cap  
D No improvement

Answer: C

Instructions
A passage is given with 5 questions following it. Read the passage carefully and choose the best answer to each question out of the four alternatives and click the button corresponding to it.

It's nothing short of a revolution in how we eat, and it's getting closer every day. Yes, a lot of people are obese, and yes, the definition of "healthy eating" seems to change all the time. But in labs and research centres around the world, scientists are racing to match our genes and our taste buds, creating the perfect diet for each of us, a diet that will fight disease, increase longevity, boost physical and mental performance, and taste great to boot. As food scientist J.Bruce German says, "The foods we like the most will be the most healthy for us."

Is that going to be a great day, or what?
All this will come to pass, thanks to genomics, the science that maps and describes an individual’s genetic code. In the future, personalized DNA chips will allow us to assess our own inherited predispositions for certain diseases, then adjust our diets accordingly. So, if you’re at risk for heart disease, you won’t just go on a generic low-fat diet. You’ll eat foods with just the right amount and type of fat that’s best for you. You’ll even be able to track your metabolism day-to-day to determine what foods you should eat at any given time, for any given activity. “Since people differ in their genetics and metabolism, one diet won’t fit all,” says German.

As complex as all this sounds, it could turn out to be relatively simple.

Question 96
What are scientists doing?

A  Racing in labs and research centres around the world
B  Asking us to start dieting
C  Creating the perfect diet for us
D  Try and make us taller

Answer: C

Question 97
What does J. Bruce German say?

A  The food we like is not healthy for us
B  The food we like is the healthiest one for us
C  The most healthy food should be liked by us
D  Food scientists like healthy food

Answer: B

Question 98
What is genomics?

A  The science which describes about maps
B  The science which describes an individual
C  The science which deals with years
D  The science that maps and describes an individual’s genetic code

Answer: D

Question 99
Why won't a common diet fit everybody?

A  Because different people eat different food
B  Because their genes are different
C  Since they differ in genetics and metabolism
Because of their different moods

Answer: C

Question 100
What will be possible in the future?

A Personalised DNA chips for people to assess their own inherited predispositions

B You are at great risk for heart disease

C You will not be able to determine what food you should eat

D You will be unable to adjust your diet

Answer: A

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