



SSC CHSL 10 July 2019 Shift-3

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Reasoning

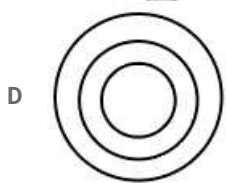
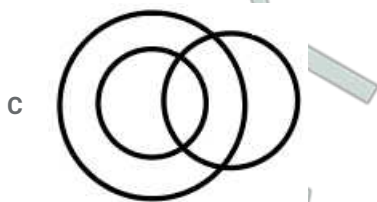
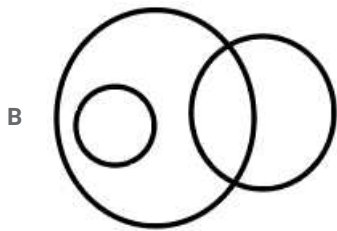
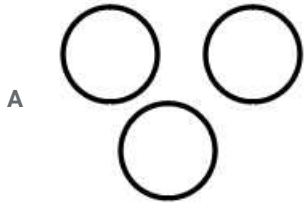
Instructions

For the following questions answer them individually

Question 1

Select the Venn diagram that best illustrates the relationship between the following classes.

Wools, Wood, Leather



Answer: A

Explanation:

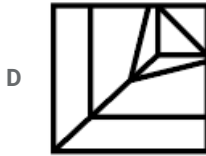
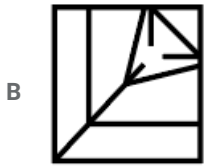
wools, wood and leather are the products obtained from different sources and they don't have any relationship.

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Question 2

Select the correct mirror image of the given figure when the mirror is placed to the right of the figure.





Answer: D

Explanation:

As we know that the right side of the object appears on the left side and vice versa in mirror image.

So, option D is the answer.

Question 3

If CAT is coded as 72 and TROT is coded as 292, then how will STAG be coded as ?

A 141

B 235

C 188

D 47

Answer: C

Explanation:

Each letter is represented by their position in the English alphabetical series.

$$\text{So, } C=3, A=1, T=20 = (3 + 1 + 20) = 24 \times 3 = 72$$

$$T=20, R=18, O=15, T=20$$

$$(20 + 18 + 15 + 20) = 73 \times 4 = 292$$

The pattern is after adding the sum is multiplied with the number of total alphabet,

$$S=19, T=20, A=1, G=7 = (19 + 20 + 1 + 7) \times 4 = 188$$

Ans: C

Question 4

Three of the following four words are alike in a certain way and one is different. Pick the odd word out.

A Storm

B Cyclone

C Flood

D Disaster

Answer: D

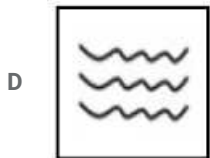
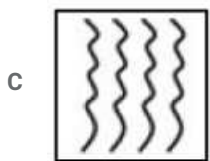
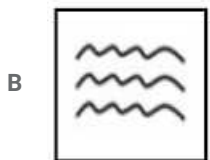
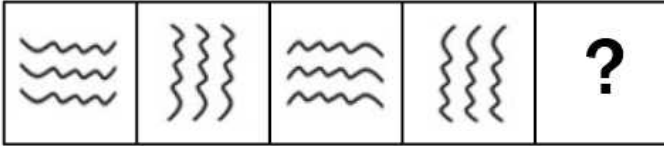
Explanation:

Storm, Cyclone and Flood are the types of disaster so disaster is different.

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Question 5

Select the Answer Fig. that will come next in the following Problem Fig.series.



Answer: D

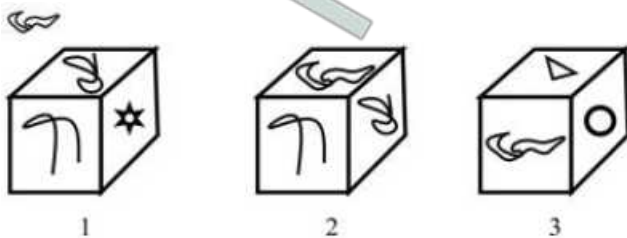
Explanation:

The figure is moving 90 degree in anti clock wise direction.

So, Ans D

Question 6

Three different positions of the same dice are shown. Select the pattern that will be on the face opposite to the one having





Answer: C

Explanation:

By seeing the different position of dice we can observe that required figure is in option C.

Question 7

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



X



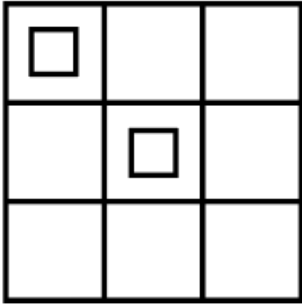
Answer: A

Explanation:

If we see the figure clearly then option A is embedded in the figure.

Question 8

How many squares are present in the following figure?



- A 18
- B 14
- C 16
- D 12

Answer: C

Explanation:

In the given figure 1 big square containing (9+2) small square = $1+9+2=12$

In big square 4 small square together make 1 new square in this way 4 new square will be there = 4

Total square = $12+4=16$

Question 9

Select the number-pair in which the two numbers are related in the same way as are the two numbers of the following number-pair.
42 : 56

- A 17 : 49
- B 35 : 51
- C 22 : 44
- D 12 : 20

Answer: D

Explanation:

$$\begin{array}{ccccccc} 42 & : & 56 & : & : & 12 & : & 20 \\ | & & | & & & | & & | \\ 6 \times 7 & & 7 \times 8 & & & 3 \times 4 & & 4 \times 5 \end{array}$$

Question 10

Which two signs should be interchanged in the following equation to make it correct?

$$15 + 15 - 2 \times 10 \div 35 = 16$$

- A \times and $-$
- B $+$ and \div
- C $+$ and $-$

D \times and \div

Answer: B

Explanation:

$$15 + 15 - 2 \times 10 \div 35 = 16$$

$$15 \div 15 - 2 \times 10 + 35 = 16$$

$$1 - 20 + 35 = 16$$

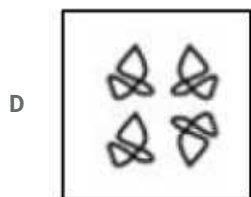
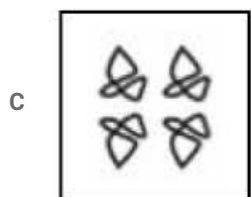
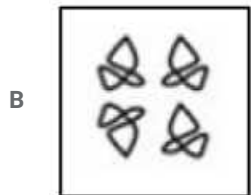
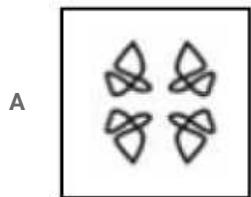
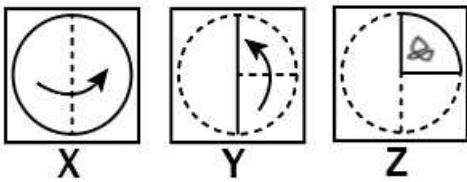
$$16 = 16$$

Ans: B

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Question 11

A paper is folded and cut as shown in the following figures (X, Y and Z). Select the option that depicts how this paper will appear when unfolded.



Answer: A

Explanation:

We will start with the last figure and move on to the first one, while tracing out all the spots on each step. We will see that out of the four options, the only one that represents the answer figure is the one in option (A).

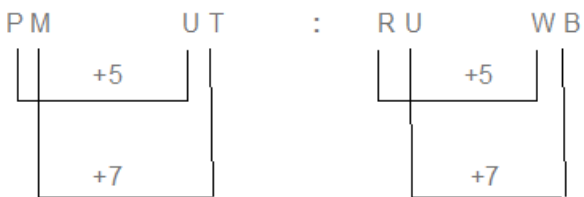
Question 12

Select the option that is related to the third letter-pair in the same way as the second letterpair is related to the first letter-pair.
PM : UT :: RU : ?

- A XA
- B WB
- C XB
- D WA

Answer: B

Explanation:



Question 13

Arrange the following words in a logical and meaningful order.

1. Summer
2. Winter
3. Monso on
4. Spring
5. Autum n

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

Answer: A

Explanation:

All the given words are name of seasons

Spring, Summer, Monsoon, Autumn, Winter are in meaningfull order.

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Question 14

Deepthi said to her friend, "That girl playing with the dog is the younger of the two sisters of the son of my mother's husband." How is the girl playing with the dog related to Deepthi ?

- A Grand daughter
- B Sister
- C Daughter - in - law
- D Wife

Answer: B

Explanation:

Mother's husband means father and sister of the son of my father means my sister. Hence, that girl is Deepthi's younger sister.

Question 15

Select the set in which the numbers are related in the same way as are the numbers of the following set.
(45, 49, 47)

- A (5, 39, 44)
- B (25, 54, 79)
- C (35, 59, 47)
- D (15, 19, 37)

Answer: C

Explanation:

First logic:

Average of 1st and 2nd number of set is equal to the third number.

So, in option C average of 35+59 is equal to 49

So, Ans : C

Second logic:

Sum of all numbers of set = $45 + 49 + 47 = 141$

In the same way set of all numbers of option C = $35 + 59 + 47 = 141$

Question 16

Three of the following four numbers are alike in a certain way and one is different. Pick the number that is different from the rest.

- A 81
- B 16
- C 100
- D 121

Answer: D

Explanation:

81, 16 and 100 are square of odd and even numbers but 121 is the square of 11 which is a prime number.

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Question 17

Select the word-pair in which the two words are related in the same way as are the two words in the following word-pair.

Trim : Hair

- A Prune : Shrub
- B Dog : Stag
- C Nail : Face
- D Eye : Red

Answer: A

Explanation:

Trim hair means doing length of hair small in the same way prune means doing length of shrub small

Question 18

Which number will replace the question mark (?) in the following series?

6, 12, 36, 144, ?

A 520

B 620

C 720

D 420

Answer: C

Explanation:

6, 12, 36, 144, ?

$$6 \times 2 = 12$$

$$12 \times 3 = 36$$

$$36 \times 4 = 144$$

$$144 \times 5 = 720$$

Question 19

Three of the following four letter-clusters are alike in a certain way and one is different. Pick the odd one out.

A BFM

B CGK

C LPT

D NRV

Answer: A

Explanation:

In option B, C and D pattern is 1st letter +4 = 2nd letter +4 = 3rd letter. But option A is not following this pattern.

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Question 20

Select the set in which the numbers are related in the same way as are the numbers of the following set.

(64, 100, 328)

A (36, 64, 97)

B (25, 49, 148)

C (16, 36, 54)

D (49, 81, 137)

Answer: B

Explanation:

(64+100+328) is following the pattern is twice the sum of 1st and 2nd number is equal to third number.

So, in (25+49+148) = 2(25+49)=148

Question 21

Three statements are given, followed by three conclusions numbered I, II and III. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.

Statements:

All knives are axes.

All axes are swords .

All saws are swords.

Conclusions:

I. All swords are knives.

II. Some axes are saws.

III. No axe is saw.

A Only conclusions I and II follow.

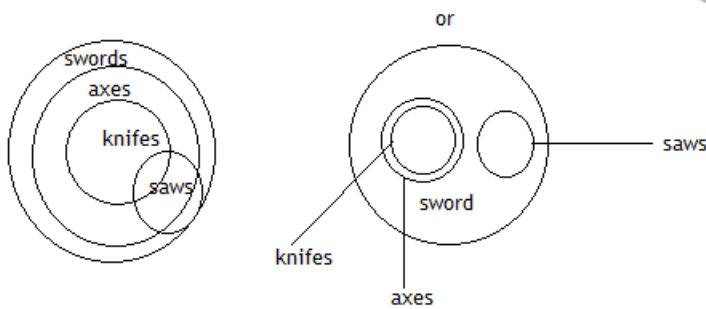
B Either conclusion II or III follows.

C All the conclusions follow.

D Only conclusion I follows.

Answer: B

Explanation:



Question 22

In a code language, HUSK is written as LZYP. How will SERIAL be written as in that language?

A WJXPIU

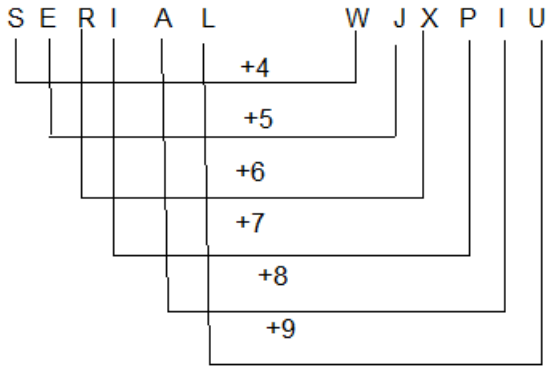
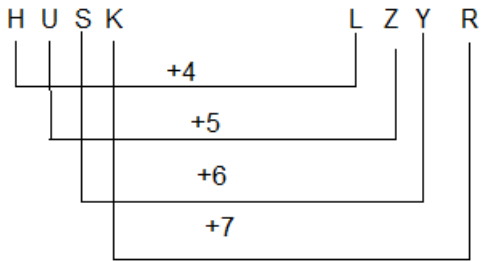
B WKYQJV

C WJXPIV

D WKYQJU

Answer: A

Explanation:



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Question 23

If it was a Friday on 1 January 2016, what was the day of the week on 31 December 2016?

- A Sunday
- B Saturday
- C Monday
- D Friday

Answer: B

Explanation:

Year 2016 was a leap year

Therefore, number of days in 2016 = 366 days = 52 weeks + 2 odd days

Now 1st January 2016 was Friday so, 30th December 2016 was also Friday

Hence, 31th December 2016 was Saturday.

Question 24

'Machine' is related to 'Operator' in the same way as 'Car' is related to '_____'.

- A Driver
- B Bus
- C Engine
- D Mechanic

Answer: A

Explanation:

Who operates machine is known as operator in the same way who drive car is known as driver.

Question 25

Which letter-pair will replace the question mark (?) in the following series?

JG, LI, ?, VS, DA

A OR

B PQ

C QM

D PM

Answer: D

Explanation:

J G,	LI,	P M,	V S,	DA
+2	+4	+6	+8	
+2	+4	+6	+8	

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General knowledge

Instructions

For the following questions answer them individually

Question 26

The famous Khajurao Group of Monuments was constructed by the _____.

A Gahadavalas

B Chaulukyas

C Chandelas

D Solankis

Answer: C

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Question 27

As per the Table of Precedence, who among the following enjoys the highest ceremonial protocol?

A Holders of Bharat Ratna

B Cabinet ministers of the Union

C Judges of the Supreme Court of India

D Deputy Chairman of Rajya Sabha

Answer: B

Question 28

The High Yielding Varieties (HYVs) of wheat were first developed in _____.

- A Mexico
- B USA
- C Japan
- D Australia

Answer: A

Question 29

Sudirman Cup, a biennial event, is associated with:

- A shooting
- B table tennis
- C hockey
- D badminton

Answer: D

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Question 30

Who among the following leaders was NOT a founding member of the Hindustan Socialist Republican Army?

- A Ajoy Ghosh
- B Jatin Das
- C Badruddin Tyabji
- D Bhagat Singh

Answer: C

Question 31

The Channel Tunnel is the name of an undersea tunnel connecting:

- A France and Germany
- B France and England
- C Spain and Morocco
- D France and Spain

Answer: B

Question 32

Which schedule of the Constitution of India contains the format of oaths to be taken by different constitutional functionaries ?

- A 3rd Schedule
- B 5th Schedule
- C 4th Schedule
- D 2nd Schedule

Answer: A

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Question 33

Which of the following rivers is NOT a part of the Ganga River System?

- A Dhansari
- B Hindan
- C Son
- D Mandakini

Answer: A

Question 34

The Pradhan Mantri Kisan Samman Nidhi scheme, announced in the Interim Budget 2019, aims at:

- A providing life insurance for small and marginal farmers
- B ensuring effective implementation of minimum support prices for all edible crops
- C ensuring minimum income for farmer families who own up to two hectares of cultivable land
- D providing medical insurance for small farmer families

Answer: C

Question 35

The Strait of _____ connects the Mediterranean Sea with the Atlantic Ocean.

- A Gibraltar
- B Messina
- C Kerch
- D Bonifacio

Answer: A

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Question 36

In which of the following organs of human body are carbohydrates stored as glycogen ?

- A Liver
- B Large intestine
- C Stomach
- D Small intestine

Answer: A

Question 37

Which of the following organisations publishes an annual report titled Global Competitiveness Index?

- A World Bank
- B International Monetary Fund
- C Asian Development Bank
- D World Economic Forum

Answer: D

Question 38

The Mughal emperor _____ adopted the title of Alamgir.

- A Akbar
- B Aurangzeb
- C Shah Jahan
- D Jahangir

Answer: B

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Question 39

In the context of computers and communication technology, 1 megabyte is equal to _____.

- A 512 bytes
- B 1024 bytes
- C 512 kilobytes
- D 1024 kilobytes

Answer: D

Question 40

The 2019 Abel Prize has been awarded to _____.

- A Karen Uhlenbeck
- B Yves Meyer
- C Robert P Langlands
- D Sir Andrew J Wiles

Answer: A

Question 41

With which of the following sports is Anjum Moudgil associated?

- A Chess
- B Shooting
- C Table tennis
- D Archery

Answer: B

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Question 42

In the context of the Internet, which of the followings is NOT a protocol ?

- A Telnet
- B PPT
- C TCP
- D UDP

Answer: B

Question 43

Who among the following Indian female wrestlers won a gold medal in the 59-kg weight category at the 2019 Dan Kovlov - Nikola Petrov tournament?

- A Navjot Kaur
- B Pooja Dhanda
- C Sakshi Malik
- D Vinesh Phogat

Answer: B

Question 44

Who among the following co-authored the book 'Indian Fiscal Federalism' along with YV Reddy?

- A Raghuram Rajan

- B Bimal Jalan
- C GR Reddy
- D Urjit Patel

Answer: C

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Question 45

The Election Commission of India recently launched a mobile app for enabling citizens to report Model Code of Conduct and Expenditure violations during the elections. The app has been named as:

- A iElect
- B cVigil
- C Samadhan
- D iMonitor

Answer: B

Question 46

Which of the following is NOT a valve of the Heart?

- A Mitral
- B Septum
- C Aortic
- D Tricuspid

Answer: B

Question 47

Who among the following is also known as the founder of macroeconomics as a separate discipline?

- A Adam Smith
- B Robert Merton
- C Fischer Black
- D John Maynard Keynes

Answer: D

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Question 48

The community called Thatheras figures in the Representative List of the Intangible Cultural Heritage of Humanity, UNESCO for _____.

- A their martial art

- B manufacturing brass and copper utensils
- C their traditional dance form called Bhangra
- D manufacturing terracotta decorative objects

Answer: B

Question 49

Under the Sustainable Alternative Towards Affordable Transportation (SATAT) scheme, _____ is being promoted as an alternative transport fuel.

- A hydrogen
- B compressed biogas
- C CNG
- D LPG

Answer: B

Question 50

Which of the following fuels has calorific value equal to petrol ?

- A Methane
- B CNG
- C LPG
- D Kerosene

Answer: D

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Quant

Instructions

For the following questions answer them individually

Question 51

If $x = \frac{1}{12.13} + \frac{1}{13.14} + \frac{1}{14.15} + \dots + \frac{1}{23.24}$ $y = \frac{1}{36.37} + \frac{1}{37.38} + \frac{1}{38.39} + \dots + \frac{1}{71.72}$, then $\frac{x}{y}$ is equal to:

- A 3
- B $\frac{1}{72}$
- C $\frac{1}{24}$
- D $\frac{1}{3}$

Answer: A

Explanation:

$$x = \frac{1}{12.13} + \frac{1}{13.14} + \frac{1}{14.15} + \dots + \frac{1}{23.24}$$

$$x = \frac{13-12}{12 \cdot 13} + \frac{14-13}{13 \cdot 14} + \frac{15-14}{14 \cdot 15} + \dots + \frac{24-23}{23 \cdot 24}$$

$$x = \frac{1}{12} - \frac{1}{13} + \frac{1}{13} - \frac{1}{14} + \frac{1}{14} - \frac{1}{15} + \dots - \frac{1}{23} + \frac{1}{24}$$

$$x = \frac{1}{12} - \frac{1}{24} = \frac{2-1}{24}$$

$$x = \frac{1}{24}$$

$$y = \frac{1}{36 \cdot 37} + \frac{1}{37 \cdot 38} + \frac{1}{38 \cdot 39} + \dots + \frac{1}{71 \cdot 72}$$

$$y = \frac{37-36}{36 \cdot 37} + \frac{38-37}{37 \cdot 38} + \frac{39-38}{38 \cdot 39} + \dots + \frac{72-71}{71 \cdot 72}$$

$$y = \frac{1}{36} - \frac{1}{37} + \frac{1}{37} - \frac{1}{38} + \frac{1}{38} - \frac{1}{39} + \dots - \frac{1}{71} + \frac{1}{72}$$

$$y = \frac{1}{36} - \frac{1}{72} = \frac{2-1}{72}$$

$$y = \frac{1}{72}$$

$$\text{So, } \frac{x}{y} = \frac{\frac{1}{24}}{\frac{1}{72}} = 3$$

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Question 52

OABC is a quadrilateral, where O is the centre of a circle and A, B, C are points in the circle, such that $\angle ABC = 120^\circ$. What is the ratio of the measure of $\angle AOC$ to that of $\angle OAC$?

A 3 : 2

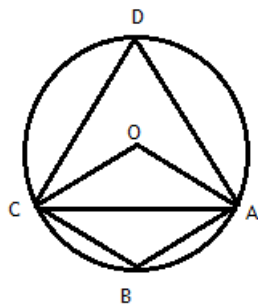
B 4 : 1

C 3 : 1

D 2 : 1

Answer: B

Explanation:



OABC is a quadrilateral, ABCD is a cyclic quadrilateral and AC is a chord

Given $\angle ABC = 120^\circ$

So, $\angle ADC = 60^\circ$ (In cyclic quadrilateral sum of opposite sides angle are 180°)

$\angle AOC = 2(\angle ADC) = 120^\circ$ (The angle from the same arc at the centre is twice the angle at the circumference)

In $\triangle AOC$, $OC=OA$ = radius and $\angle AOC = 120^\circ$

So, $\angle OAC = \angle OCA = 30^\circ$

Hence, $\angle AOC : \angle OAC = 4:1$

Question 53

Given that the lengths of the paths of a ball thrown with different speeds by two boys are the same, and that the average speed for the first and second throws are respectively 90 km/h and 162 km/h, then what is the time taken by the first throw to cover the length if the same for the second throw is one second?

- A $\frac{3}{2}$ sec
- B 1 sec
- C $\frac{2}{3}$ sec
- D $\frac{9}{5}$ sec

Answer: D

Explanation:

We know that length = *Speed* \times *time*

For same length

$$S_1 \times T_1 = S_2 \times T_2$$

$$90 \times \frac{5}{18} \times T_1 = 162 \times \frac{5}{18} \times 1$$

multiplied by $\frac{5}{18}$ to convert in m/sec

$$25 \times T_1 = 45$$

$$T_1 = \frac{45}{25} = \frac{9}{5} \text{ sec}$$

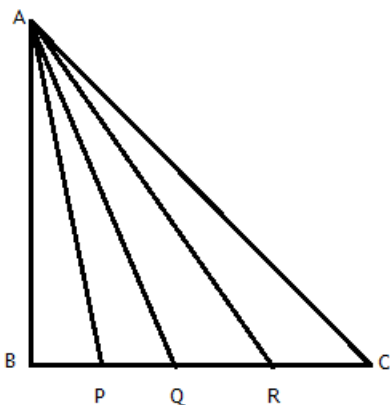
Question 54

The side BC of a right-angled triangle ABC ($\angle ABC = 90^\circ$) is divided into four equal parts at P, Q and R respectively. If $AP^2 + AQ^2 + AR^2 = 3b^2 + 17na^2$ then n is equal to:

- A $\frac{3}{4}$
- B $\frac{1}{8}$
- C $-\frac{1}{8}$
- D $-\frac{3}{4}$

Answer: C

Explanation:



In $\triangle ABC$, $AB = c$, $BC = a$, and $AC = b$

and $BP = PQ = QR = RC = \frac{a}{4}$

Now, by pythagoras theorem

$$(AP)^2 = (AB)^2 + (BP)^2 = c^2 + \left(\frac{a}{4}\right)^2 \text{---(i)}$$

$$(AQ)^2 = (AB)^2 + (BQ)^2 = c^2 + \left(\frac{2a}{4}\right)^2 \text{---(ii)}$$

$$(AR)^2 = (AB)^2 + (BR)^2 = c^2 + \left(\frac{3a}{4}\right)^2 \text{---(iii)}$$

Adding (i), (ii) and (iii)

$$(AP)^2 + (AQ)^2 + (AR)^2 = c^2 + \frac{a^2}{16} + \frac{4a^2}{16} + \frac{9a^2}{16}$$

$$(AP)^2 + (AQ)^2 + (AR)^2 = 3c^2 + \frac{14a^2}{16} = 3c^2 + \frac{7a^2}{8}$$

From, $\triangle ABC$,

$$b^2 = c^2 + a^2$$

$$c^2 = b^2 - a^2$$

$$(AP)^2 + (AQ)^2 + (AR)^2 = 3c^2 + \frac{7a^2}{8}$$

$$(AP)^2 + (AQ)^2 + (AR)^2 = 3(b^2 - a^2) + \frac{7a^2}{8} = 3b^2 - \left(3 - \frac{7}{8}\right)a^2$$

$$(AP)^2 + (AQ)^2 + (AR)^2 = 3b^2 - \frac{17}{8}a^2$$

Now, we will compare,

$$3b^2 - \frac{17}{8}a^2 = 3b^2 + 17na^2$$

$$\text{Hence, } n = \frac{1}{8}$$

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Question 55

A shopkeeper bought an article for ₹100 and marked its price 25% above the cost price. How much discount percentage should he announce in order to make a profit of 15%?

- A 10
- B 8.25
- C 8
- D 8.5

Answer: C

Explanation:

C.P= Rs 100

M.P= Rs 125

Required Profit= 15%

$$S.P = C.P \times \frac{\text{Profit}}{100}$$

$$S.P = 100 \times \frac{15}{100}$$

S.P =Rs 115

Discount=125 - 115= Rs 10

$$\text{Discount\%} = \frac{10 \times 100}{125} = 8$$

Question 56

A borrowed a sum of ₹3,000 from his friend B on 31 December 2007 on the condition that he would return the same after one year with simple interest at 15% per annum. However, A gets into a position of returning the sum on 31 August 2008. How much amount had to return to B?

- A ₹3,310
- B ₹3,305
- C ₹3,300
- D ₹3,200

Answer: C

Explanation:

P = 3000, R = 15%, T = 8 months...(31st dec to 31st aug)

$$S.I = \frac{P \times T \times R}{100}$$

$$S.I = \frac{3000 \times 8 \times 15}{100 \times 12} = \text{Rs } 300$$

Amount = P+S.I=3000+300= Rs 3300

So, amount he had to return = Rs 3300

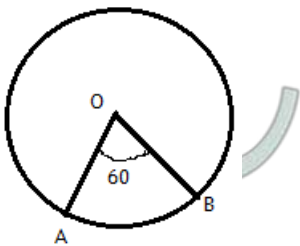
Question 57

The area of a sector of a circle with central angle 60° is A. The circumference of the circle is C. Then A is equal to:

- A $\frac{c^2}{18\pi}$
- B $\frac{c^2}{6\pi}$
- C $\frac{c^2}{24\pi}$
- D $\frac{c^2}{4\pi}$

Answer: C

Explanation:



Area of the sector with central angle $\theta = \frac{\theta}{360} \times \pi r^2$

$$\text{Area} = \frac{60}{360} \times \pi r^2 = \frac{\pi r^2}{6} \text{ -----i}$$

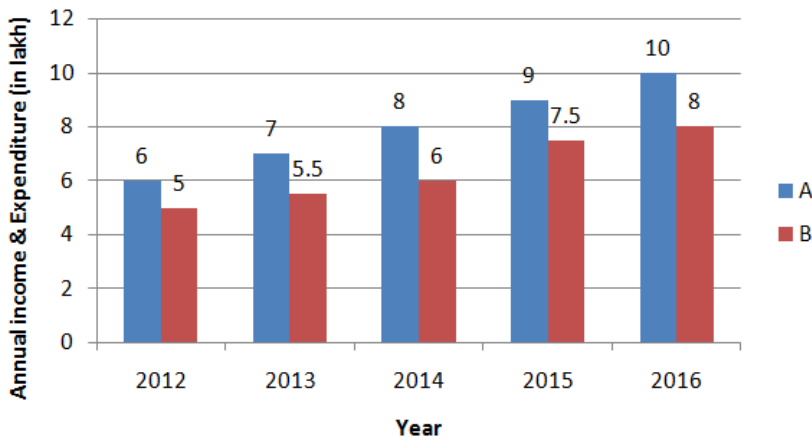
Circumference of the circle $C = 2\pi r$ -----ii

$$\text{From i, } A = \frac{\pi r^2}{6} = \frac{4\pi \cdot \pi^2}{6 \cdot 4\pi} \text{ (numerator and denominator multiplied by } 4\pi)$$

$$\text{So, } A = \frac{(2\pi r)^2}{24\pi} = \frac{C^2}{24\pi} \text{---(From ii)}$$

Question 58

The given Bar Graph presents the data of annual income (A) and annual expenditure (B) of an IT officer in a multinational company during the years 2012 to 2016.



What is the percentage of his total savings with reference to his total income for the period 2012-15 ?

- A 20
- B 30
- C 25
- D 27.5

Answer: A

Explanation:

Savings = Income - Expenditure

For the year 2012, Savings = 6 - 5 = 1

Similarly we will calculate the values for the rest of years and get as

Total savings = 1+1.5+2+1.5=6

Total income = 6+7+8+9=30

Required percentage = $\frac{6}{30} \times 100 = 20\%$

Question 59

It is given that $\triangle ABC \sim \triangle PRQ$ and that Area ABC : Area PRQ = 16 : 169. If AB=x, AC=y, BC=z (all in cm), then PQ is equal to:

- A $\frac{13}{4} y$
- B $\frac{13}{4} z$
- C $\frac{13}{8} x$
- D $\frac{13}{4} x$

Answer: A

Explanation:

Ratio of the areas of two similar triangles is equal to the square of ratio of their corresponding sides.

so,

$$16 : 169 = y^2 : (PQ)^2$$

$$\frac{4^2}{13^2} = \frac{y^2}{(PQ)^2}$$

$$\frac{4}{13} = \frac{y}{PQ}$$

$$PQ = \frac{13y}{4}$$

Question 60

An article is subject to two successive discounts of 10% and 5% before being sold. If its marked price is ₹800, then its selling price is:

- A ₹684
- B ₹722
- C ₹703
- D ₹680

Answer: A

Explanation:

$$\text{Selling price} = 800 \times \frac{90}{100} \times \frac{95}{100} = \text{Rs } 684$$

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Question 61

If $a^2 + b^2 = 169$, $ab = 60$, ($a > b$), then $(a^2 - b^2)$ is equal to:

- A 139
- B 149
- C 119
- D 129

Answer: C

Explanation:

$$\text{Given } a^2 + b^2 = 169, ab = 60, (a > b)$$

$$(a + b)^2 = a^2 + b^2 + 2ab$$

$$(a + b)^2 = 169 + 2 \times 60 = 289$$

$$(a + b) = 17$$

$$ab = 60, \text{ so } a = \frac{60}{b}$$

$$\text{Now, } (a+b) = 17$$

$$\frac{60}{b} + b = 17$$

$$b^2 - 17b + 60 = 0$$

$$b^2 - 12b - 5b + 60 = 0$$

$$b(b-12) - 5(b-12) = 0$$

$$b = 12 \text{ and } 5 \dots \text{neglect } b = 12 \text{ because } a > b \text{ given}$$

$$\text{So, } a = 12$$

$$(a^2 - b^2) = (a + b)(a - b) = 17 \times 7 = 119$$

Question 62

If $\theta = 9^\circ$, then what is the value of

$$\cot \theta \cot 2\theta \cot 3\theta \cot 4\theta \cot 5\theta \cot 6\theta \cot 7\theta \cot 8\theta \cot 9\theta ?$$

A $\sqrt{3}$

B $\sqrt{3} - 1$

C 1

D $\frac{1}{\sqrt{3}}$

Answer: C

Explanation:

Give, $\theta = 9^\circ$

$$\cot \theta \cot 2\theta \cot 3\theta \cot 4\theta \cot 5\theta \cot 6\theta \cot 7\theta \cot 8\theta \cot 9\theta$$

$$\cot 9^\circ \cot 18^\circ \cot 27^\circ \cot 36^\circ \cot 45^\circ \cot 54^\circ \cot 63^\circ \cot 72^\circ \cot 81^\circ$$

$$\cot 9^\circ \cot 81^\circ \cot 18^\circ \cot 72^\circ \cot 27^\circ \cot 63^\circ \cot 36^\circ \cot 54^\circ \cot 45^\circ$$

$$\cot(90^\circ - 81^\circ) \cot 81^\circ \cot(90^\circ - 72^\circ) \cot 72^\circ \cot(90^\circ - 63^\circ) \cot 63^\circ \cot(90^\circ - 54^\circ) \cot 54^\circ \cot 45^\circ$$

$$\tan 81^\circ \cot 81^\circ \tan 72^\circ \cot 72^\circ \tan 63^\circ \cot 63^\circ \tan 54^\circ \cot 54^\circ \cot 45^\circ = 1.$$

As $\tan \theta \times \cot \theta = 1$ and $\cot 45^\circ = 1$

So we get our answer as 1

Question 63

A milkman uses three containers for selling milk, their capacities being 40 L, 30 L and 20 respectively. He fills respectively 87.5%, 80% and 90% of the containers with a mix of milk and water in the ratios, 3: 2, 5: 1 and 7:2 respectively. What is the ratio of the total quantity of milk to that of water carried by him?

A 5:2

B 35:9

C 7:2

D 31:12

Answer: A

Explanation:

In container A milk and water = 87.5% of 40 = 35

$$\text{In container A milk} = \frac{3}{5} \times 35 = 21 \text{ and In container A water} = \frac{2}{5} \times 35 = 14$$

In container B milk and water = 80% of 30 = 24

$$\text{In container B milk} = \frac{5}{6} \times 24 = 20 \text{ and In container B water} = \frac{1}{6} \times 24 = 4$$

In container C milk and water = 90% of 20 = 18

$$\text{In container C milk} = \frac{7}{9} \times 18 = 14 \text{ and In container C water} = \frac{2}{9} \times 18 = 4$$

Now, ratio of the total quantity of milk to that of water carried by him = $(21+20+14) : (14+4+4) = 55:22 = 5 : 2$

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Question 64

The simplified value of $\frac{0.01404}{24^2+6^2-144}$ is:

A 3×10^{-5}

- B 6×10^{-5}
- C 3×10^{-4}
- D 2.4×10^{-4}

Answer: A

Explanation:

$$\frac{0.01404}{24^2 + 6^2 - 144}$$

$$\frac{0.01404}{576 + 36 - 144}$$

$$\frac{0.01404}{468} = 0.00003$$

$$3 \times 10^{-5}$$

Question 65

It is given that, $\sqrt{\frac{1-\sin x}{1+\sin x}} = a - \tan x$ then a is equal to:

- A $\sec x$
- B $\operatorname{cosec} x$
- C $\sin x$
- D $\cos x$

Answer: A

Explanation:

$$\sqrt{\frac{1-\sin x}{1+\sin x}} = a - \tan x$$

$$\sqrt{\frac{1-\sin x}{1+\sin x} \times \frac{1-\sin x}{1-\sin x}} = a - \tan x$$

$$\sqrt{\frac{(1-\sin x)^2}{1^2 - \sin^2 x}} = a - \frac{\sin x}{\cos x}$$

$$\sqrt{\frac{(1-\sin x)^2}{\cos^2 x}} = a - \frac{\sin x}{\cos x}$$

$$\frac{1-\sin x}{\cos x} = a - \frac{\sin x}{\cos x}, \text{ Because } \sin^2 x + \cos^2 x = 1$$

$$\frac{1}{\cos x} + \frac{\sin x}{\cos x} = a - \frac{\sin x}{\cos x}$$

$$a = \frac{1}{\cos x} = \sec x$$

Question 66

A rectangular portion of an airport runway was getting repaired for which an estimate was made on the basis of a rate ₹R per square unit. But while doing the work, the length of the portion got increased by 10% and the breadth by 8%. Over and above this, there was an increase in the cost of the repair work to the extent of 15%. What was the overall percentage increase in the cost of repair over the estimate?

- A 44.14
- B 33
- C 35.24
- D 34.58

Answer: A

Explanation:

Overall percentage increase in area of rectangle = $x \pm y \pm \frac{xy}{100}$ where x = length and y = breadth

$$= 10 + 8 + \frac{80}{100} = 18.8$$

Now there was a cost of extent = 15% so,

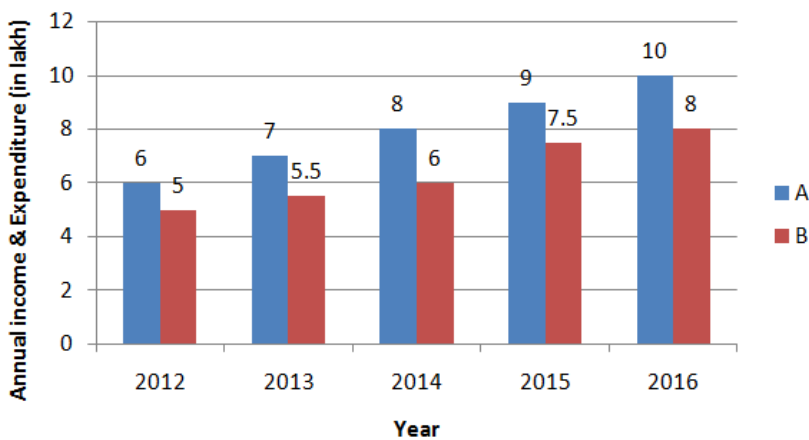
Overall percentage increase in the cost of repair over the estimate = $x \pm y \pm \frac{xy}{100}$

$$= 18.8 + 15 + \frac{18.8 \times 15}{100} = 44.14$$

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Question 67

The given Bar Graph presents the data of annual income (A) and annual expenditure (B) of an IT officer in a multinational company during the years 2012 to 2016.



For which pair of years, the ratio of savings to expenditure is equal?

- A 2014, 2015
- B 2012, 2015
- C 2013, 2014
- D 2012, 2013

Answer: B

Explanation:

Ratio of savings to expenditure in 2012 = $\frac{1}{5}$

Ratio of savings to expenditure in 2015 = $\frac{1.5}{7.5} = \frac{1}{5}$

So, ratio of savings to expenditure in 2012 and 2015 is equal.

Question 68

Which among the following numbers is exactly divisible by 11, 13 and 7?

- A 259270
- B 259237
- C 259248

D 259259

Answer: D

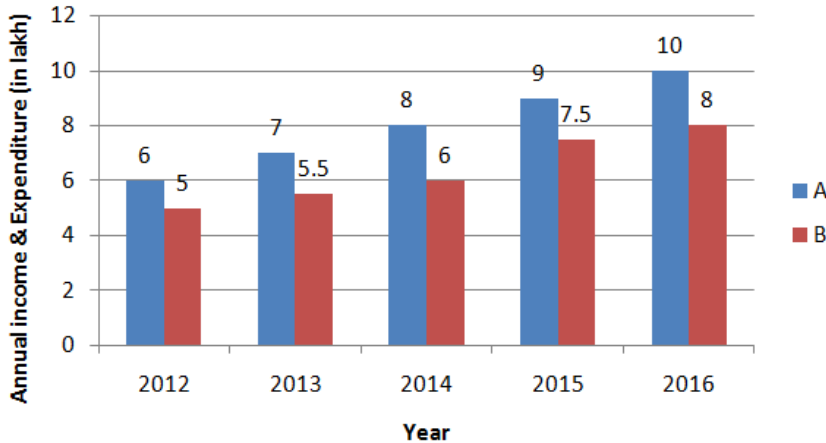
Explanation:

L.C.M of 11, 13 and 7 is 1001

Only 259259 from given option is divisible by 1001

Question 69

The given Bar Graph presents the data of annual income (A) and annual expenditure (B) of an IT officer in a multinational company during the years 2012 to 2016.



What is the ratio between the ratios of Savings to Expenditure, respectively for the periods 2012-13 and 2015-16?

A 146:135

B 25:36

C 21:34

D 155:147

Answer: D

Explanation:

Ratios of Savings to Expenditure from 2012 to 2013 = $(1+1.5) : (5+5.5) = 25 : 105$

Ratios of Savings to Expenditure from 2015 to 2016 = $(1.5+2) : (7.5+8) = 35 : 155$

Required ratio = $\frac{25}{105} : \frac{35}{155} = 155 : 147$

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Question 70

It is given that men are twice as efficient than women in respect of doing a work. If three men and two women can complete the work in 2 days, then in how many days can a woman working alone complete the work ?

A $10\frac{1}{3}$

B $12\frac{1}{2}$

C 16

D 8

Answer: C

Explanation:

Ratio of efficiency of Men and Women = 2 : 1

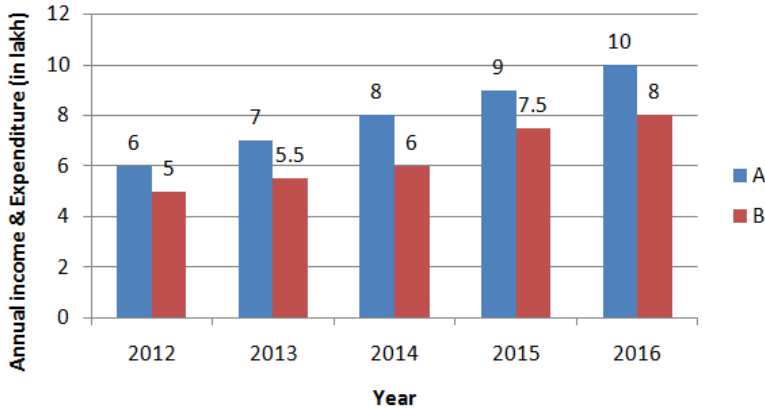
Total work = (men or women) \times days

So, total work = $(3m + 2m) \times 2 = (3 \times 2 + 2 \times 1) \times 2 = 16$

1 woman can complete in = 16 days

Question 71

The given Bar Graph presents the data of annual income (A) and annual expenditure (B) of an IT officer in a multinational company during the years 2012 to 2016.



What was his average monthly savings (in ₹) in 2015 and 2016, taken together (correct to two decimal places)?

- A 14,583.33
- B 14,967.67
- C 14,506.33
- D 13,687.67

Answer: A

Explanation:

Annual income in 2015 = 9 lakhs

Annual expenditure in 2015 = 7.5 lakhs

Annual savings in 2015 = $9 - 7.5 = 1.5$ lakhs

Annual income in 2016 = 10 lakhs

Annual expenditure in 2016 = 8 lakhs

Annual savings in 2016 = $10 - 8 = 2$ lakhs

Average of annual savings in 2015 and 2016 = $\frac{1.5+2}{2} = 175000$

Monthly annual savings in 2015 and 2016 = $\frac{175000}{12} = Rs14583.33$

Question 72

The simplified value of $\frac{1}{2}$ of $\frac{8}{5} \div \left\{ 2\frac{1}{5} - \left(\frac{5}{16} + \frac{3}{5} \times 1\frac{7}{8} \div \frac{2}{3} \right) \right\}$ is:

- A $\frac{1}{5}$
- B 4
- C $\frac{1}{4}$

D 5

Answer: B

Explanation:

$$\frac{1}{2} \text{ of } \frac{8}{5} \div \left\{ 2\frac{1}{5} - \left(\frac{5}{16} + \frac{3}{5} \times 1\frac{7}{8} \div \frac{2}{3} \right) \right\}$$

$$\frac{1}{2} \times \frac{8}{5} \div \left\{ \frac{11}{5} - \left(\frac{5}{16} + \frac{3}{5} \times \frac{15}{8} \times \frac{3}{2} \right) \right\}$$

$$\frac{4}{5} \div \left\{ \frac{11}{5} - \left(\frac{5}{16} + \frac{27}{16} \right) \right\}$$

$$\frac{4}{5} \div \left\{ \frac{11}{5} - 2 \right\}$$

$$\frac{4}{5} \times 5 = 4$$

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Question 73

The difference between the average of first ten prime numbers and the first ten prime numbers of two digits is:

A 12.5

B 16.5

C 13.5

D 14.5

Answer: C

Explanation:

First ten prime numbers = 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

Sum of first ten prime numbers = $2 + 3 + 5 + 7 + 11 + 13 + 17 + 19 + 23 + 29 = 129$

Average of first ten prime numbers = $\frac{129}{10} = 12.9$

First ten prime numbers of two digits = 11, 13, 17, 19, 23, 29, 31, 37, 41, 43

Sum of first ten prime numbers of two digits = $11 + 13 + 17 + 19 + 23 + 29 + 31 + 37 + 41 + 43 = 264$

Average of first ten prime numbers of two digits = $\frac{264}{10} = 26.4$

Required difference = $26.4 - 12.9 = 13.5$

Question 74

For α and β both being acute angles, it is given that $\sin(\alpha + \beta) = 1$, $\cos(\alpha - \beta) = \frac{1}{2}$. The values of α and β are:

A $75^\circ, 15^\circ$

B $60^\circ, 30^\circ$

C $45^\circ, 15^\circ$

D $75^\circ, 45^\circ$

Answer: A

Explanation:

$$\sin(\alpha + \beta) = 1$$

$$(\alpha + \beta) = 90^\circ \text{ -----i}$$

$$\cos(\alpha - \beta) = \frac{1}{2}$$

$$(\alpha - \beta) = 60^\circ \text{ -----ii}$$

Adding i and ii we get,

$$2(\alpha) = 150$$

$$(\alpha) = 75^\circ \text{ and } (\beta) = 15^\circ$$

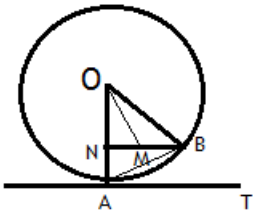
Question 75

A and B are two points on a circle with centre O. AT is a tangent, such that $\angle BAT = 45^\circ$. N is a point on OA, such that BN = 10 cm. The length of the median OM of the $\triangle NOB$ is:

- A 5 cm
- B $5\sqrt{3}$ cm
- C $10\sqrt{2}$ cm
- D $5\sqrt{2}$ cm

Answer: A

Explanation:



As AT is a tangent

$$\angle OAT = 90^\circ$$

Again $\angle BAT = 45^\circ$

$$\text{So, } \angle OAB = 90 - 45 = 45^\circ$$

$$\triangle AOB, OA = OB$$

$$\text{So, } \angle OAB = \angle OBA = 45^\circ$$

$$\text{Then, } \angle NOB = 180 - 45 - 45 = 90^\circ$$

And $\triangle BON$ is also right angled triangle.

Now, OM is a median of $\triangle BON$,

Therefore, OM divides BN in two equal part

$$\text{Hence, } BM = OM = 5 \text{ cm}$$

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English

Instructions

For the following questions answer them individually

Question 76

Select the most appropriate meaning of the underlined idiom in the given sentence.

My aunt who orders every one around is a pain in the neck.

- A irritating
- B argumentative
- C curious
- D short tempered

Answer: A

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Question 77

Select the correctly spelt word.

- A contrapsion
- B controdiction
- C cunstruction
- D controversy

Answer: D

Question 78

Identify the segment in the sentence, which contains the grammatical error.

My grandmother has been lives in Shimla since her childhood days.

- A in Shimla since
- B My grandmother
- C has been lives
- D her childhood days

Answer: C

Question 79

Choose the option that is the passive form of the sentence.

The chief guest gave prizes to the children.

- A The children were given prizes by the chief guest.
- B The children were being given prizes by the chief guest.
- C The children was given prizes by the chief guest.
- D The children are given prizes by the chief guest.

Answer: A

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Question 80

Select the word which means the same as the group of words given.
The original inhabitants of a country

- A aborigines
- B residents
- C immigrants
- D slaves

Answer: A

Question 81

Select the most appropriate synonym of the given word.
RECEDE

- A increase
- B intensify
- C waver
- D wane

Answer: D

Question 82

Select the correctly spelt word.

- A neessary
- B necassery
- C necessery
- D necessary

Answer: D

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Question 83

Select the word which means the same as the group of words given.
One who treats skin diseases

- A dermatologist
- B geologist
- C cardiologist
- D radiologist

Answer: A

Question 84

Select the most appropriate option to fill in the blank.
The employees of our company are not _____ of their freedom.

- A denied
- B deployed
- C deprived
- D dissipated

Answer: C

Question 85

Identify the segment in the sentence, which contains the grammatical error.
Very little metals are as precious as gold.

- A Very little
- B as gold
- C as precious
- D metals are

Answer: A

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Question 86

Select the most appropriate synonym of the given word.
WARY

- A inattentive
- B lax
- C rash
- D alert

Answer: D

Question 87

Select the alternative that will improve the underlined part of the sentence in case there is no improvement select No improvement.
I experienced excruciating pain when the hammer fell on my foot.

- A strong pains
- B No improvement
- C exciting pain
- D affable paining

Answer: B

Question 88

Select the most appropriate option to fill in the blank.
The Prime Minister was _____ a ceremonial welcome.

- A expected
- B invited
- C initiated
- D extended

Answer: D

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Question 89

Choose the option that is the indirect form of the sentence.
A new student said to me, "Where is the Principal's office?"

- A A new student asked me where is the Principal's office.
- B A new student asked me where the Principal's office was.
- C A new student said to me where the Principal's office was.
- D A new student asked me where the Principal's office is.

Answer: B

Question 90

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

- A. Yes, first get us some fresh juice and some sandwiches.
- B. May I take your order?
- C. Not now, maybe a little later.
- D. Sure. Would you like some coffee too?

- A BCDA
- B ABCD
- C CDBA
- D BADC

Answer: D

Instructions

Select the most appropriate antonym of the given word.

Question 91

AMASS

- A horde
- B heap

- C collect
- D distribute

Answer: D

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Question 92

POROUS

- A spongy
- B impermeable
- C permeable
- D absorbent

Answer: B

Instructions

For the following questions answer them individually

Question 93

Select the most appropriate meaning of the underlined idiom in the given sentence.
Please come to the point, don't beat around the bush.

- A avoid the topic
- B make excuses
- C hide behind a bush
- D accept defeat

Answer: A

Question 94

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

- A. Then she does some gardening.
- B. Finally before her mid morning nap, she eats a light breakfast.
- C. My grandmother is an active eighty year old.
- D. She begins her morning with meditation.

- A CABD
- B CDAB
- C CDBA
- D DCBA

Answer: B

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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:

The two men bowed to one (1) _____ and parted. D'Artagnan found himself in a difficult (2) _____. He was going to have to (3) _____ three duels in a (4) _____ of three hours. He thought, "If they kill me, (5) _____ I shall be killed by a Musketeer."

Question 95

Select the most appropriate option to fill blank no. 1

- A another
- B each
- C self
- D other

Answer: A

Question 96

Select the most appropriate option to fill blank no. 2

- A relation
- B location
- C situation
- D station

Answer: C

Question 97

Select the most appropriate option to fill blank no. 3

- A fight
- B fix
- C figure out
- D think out

Answer: A

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Question 98

Select the most appropriate option to fill blank no. 4

- A matter
- B place
- C time
- D gap

Answer: A

Question 99

Select the most appropriate option to fill blank no. 5

- A least
- B maximum
- C even though
- D at least

Answer: D

Instructions

For the following questions answer them individually

Question 100

Select the alternative that will improve the underlined part of the sentence in case there is no improvement select No improvement.
The crowd wave feverishly when they saw their leader.

- A wave well
- B No improvement
- C waved frantically
- D waving hard

Answer: C

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