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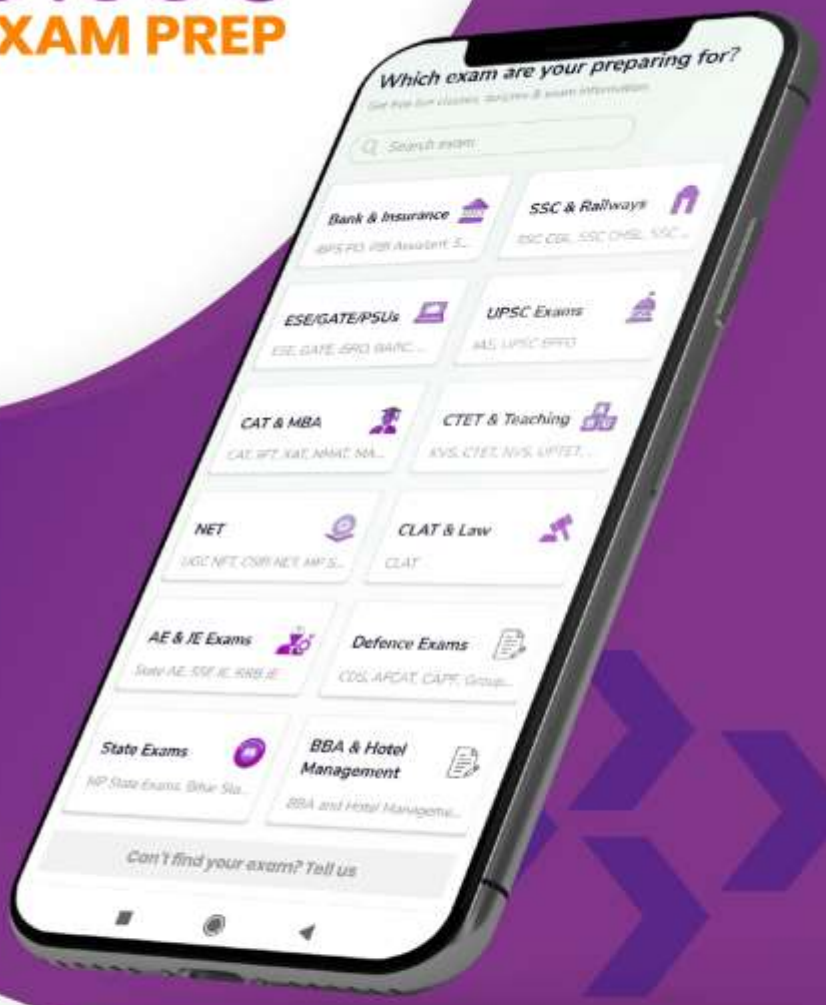

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1.Which number will replace the question mark (?) in the following series?
5, 9, 18, 43, 92, 213, 382, ?
A. 328
B. 617
C. 382
D. 671

Ans. D
Sol.
In each number, there is addition of the square of consecutive prime numbers.
5 + 4 (2^2) = 9
9 + 9 (3^3) = 18
18 + 25 (5^2) = 43
43 + 49 (7^2) = 92
92 + 121 (11^2) = 213
213 + 169 (13^2) = 382
382 + 289 (17^2) = 671
Hence, option D is correct.

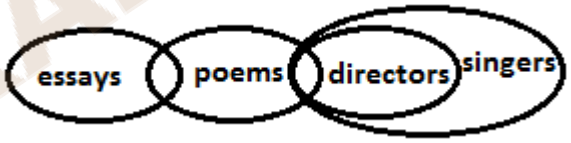
2.Rahul has Rs. 340 in the denominations of Rs. 2 notes, Rs. 5 notes and Rs. 10 notes. The number of notes of each denomination is equal. What is the total number of notes that Rahul has?
A. 40
B. 60
C. 20
D. 80

Ans. B
Sol.
Let the total number of notes be $3x$ (as he has equal denomination of notes)
ATQ –
$2x + 5x + 10x = 340$
$17x = 340$
$x = 20$
So, the total number of notes = $3 \times 20 = 60$.
Hence, option B is the correct answer.

3.**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:
Some essays are poems.
Some poems are directors.
All directors are singers.
Conclusions:
I. Some directors are poems.
II. Some singers are essays.
III. Some singers are poems.
A. Only conclusions I and III follow.
B. Only conclusions II and III follow.
C. Only conclusions I and II follow.
D. Only conclusion I follow.

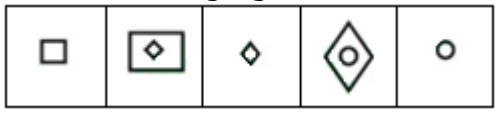
Ans. A
Sol.



Conclusions:
I. Some directors are poems – (true) it is a definite case.
II. Some singers are essays. – (false) it is not a definite case.
III. Some singers are poems – (true) it is a definite case.

Hence, option A is correct.

4.Select the figure that will come next in the following figure series.



A. 

B. 

C. 

D. 

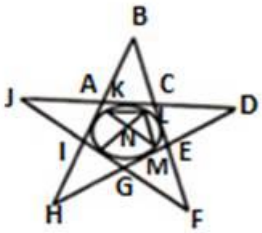
Ans. D
Sol.
Here, the pattern is as follows: a new figure is introduced into the previous figure in each alternate step. So, according to the pattern the next fig. in the series will be –

Hence, option D is correct.

5.How many triangles are present in the following figure?

A. 14
B. 13
C. 10
D. 12

Ans. B
Sol.



The triangles formed in the figure are – ABC, CDE, EFG, GHI, IJA, JDG, FIB, BEH, AHD, JCF, KLM, KLN, and LNM.
The number of triangles formed – 13.
Hence, option B is correct.

6.Arrange the following words in the logical and meaningful order.
1) Promotion
2) Application
3) Job appointment
4) Written test
5) Merit list
A. 2, 5, 4, 3, 1
B. 3, 2, 4, 1, 5
C. 4, 2, 5, 3, 1
D. 2, 4, 5, 3, 1

Ans. D
Sol.
The logical order is –
2. Application
4. Written test
5. Merit list
3. Job appointment
1. Promotion
Hence, option D is correct.

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

24 ÷ 2 + 13 − 54 × 2 = 34
A. + and ×
B. − and ×
C. × and ÷
D. − and ÷

Ans. C
Sol.
To make the above equation correct, × and ÷ needs to be interchanged.
After interchanging the equation will be:
→ 24 × 2 + 13 – 54 ÷ 2 {Applying BODMAS}
= 24 × 2 + 13 – 27
= 48 + 13 – 27
= 61 – 27
= 34
Hence, option C is correct.

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

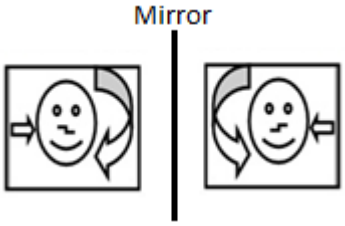
A. 

B. 

C. 

D. 

Ans. B
Sol.
In a plane mirror, a mirror image is a reflected duplication of an object that appears almost identical, but it is reversed in the direction perpendicular to the mirror surface. As an optical effect it results from reflection of substances such as a mirror or water.



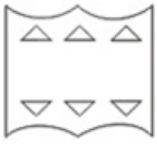
Hence, option B is correct.

9.A paper is folded and cut as shown in the following figures. How will it appear when unfolded?

A. 

B. 

C. 

D. 

Ans. B
Sol.
The paper is unfolded in two steps –
Step 1 :

Step 2 :

Hence, option B is correct.

10.**Select the option that is related to the third number is the same way as the second number is related to the first number.**

54 : 41 :: 32 : ?
A. 29
B. 13
C. 17
D. 11

Ans. B
Sol.
$5^2 + 4^2 = 25 + 16 = 41$
Likewise,
$3^2 + 2^2 = 9 + 4 = 13$
Hence, option B is the correct answer.

11.**Select the correct mirror image of the given figure when a mirror is placed on the line PQ.**

Question figure:

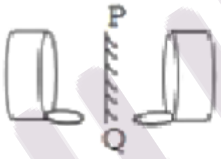
A. 

B. 

C. 

D. 

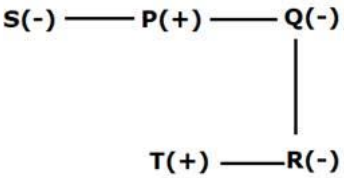
Ans. D
Sol.
On close observation we find that the correct mirror image will be:



Hence, option D is the correct answer.

12.P is the brother of Q. R is the daughter of Q. S is the sister of P. Q is sister of S. T is the brother of R. Who is the uncle of T?
A. P
B. Q
C. C
D. S

Ans. A
Sol.
As per the given information:



So, P is uncle of T.
Hence, option A is correct answer.

13.**Select the number that replace the Question mark (?) in the following series?**

126, 217, 344, ?
A. 513

B. 521
C. 729
D. 512

Ans. A
Sol.
The pattern is: Cubes of consecutive numbers starting from 5 +1
5^3+ 1 = 125+1 = 126
6^3+ 1 = 216+1 = 217
7^3+ 1 = 343+1 = 344
8^3+ 1 = 512+1 = 513
Hence, option A is the correct answer.

14.If '#' means '–', & means '÷', '@' means '×', ÷ means '+', then 15 @ 2 + 900 & 30 # 10 = ?
A. 21
B. 310
C. 50
D. 600

Ans. C
Sol.
After interchanging the symbols:
=15 x 2 + 900 ÷ 30 – 10
=15 x 2 + 30 – 10
=30 + 30 -10
=50
Hence, option C is correct answer.

15.**Select the figure that can replace the Question mark (?) in the following figure series.**
Questions figure:

A. 

B. 

C. 

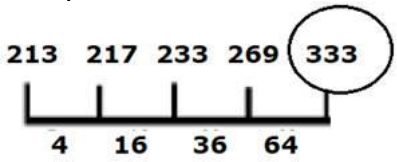
D. 

Ans. B
Sol.
Logic is: Figure is moving in clockwise direction and in each case, number of dots and triangles are increasing by 1.

Hence, option B is correct answer.

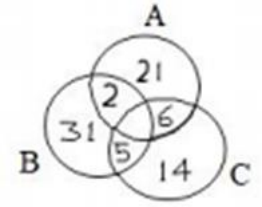
16.**Select the number that can replace the Question mark (?) in the following series.**
213, 217, 233, 269, ?
A. 296
B. 333
C. 428
D. 312

Ans. B
Sol.
The pattern is:



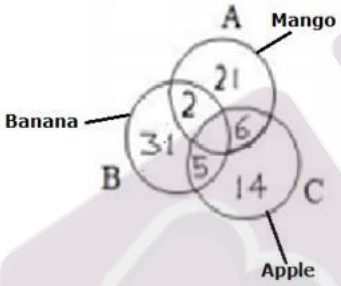
Logic : square of consecutive even number is getting added.
Hence, option B is the correct answer.

17.In the given Venn diagram, A mangoes, B denotes bananas, C denotes apples, and the numbers in each section represent the number of persons who like those fruits. How many persons like only bananas?



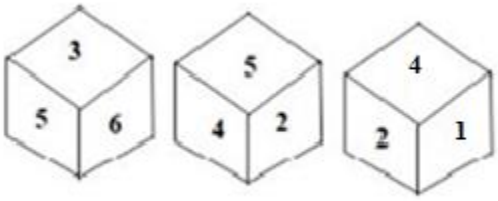
A. 38
B. 7
C. 31
D. 33

Ans. C
Sol.
As shown in diagram



Portion belongs to only Banana is 31
Hence, option C is the correct answer.

18.Three different positions of the same dice are shown. Select the number that will be on the face opposite to the one having 5.



A. 1
B. 4
C. 6
D. 3

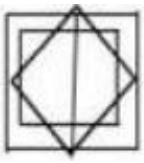
Ans. A
Sol.
Let's compare 1st, 2nd and 3rd dice, keeping '3' as common face and moving in clockwise direction we observed the faces that are opposite to each other are:
6 → 2
1 → 5
3 → 4
So, it is clear that '1' is opposite to '5'.
Hence, option A is correct answer.

19.**Select the option in which the given figure is embedded. (Rotation is not allowed)**

Question figure:

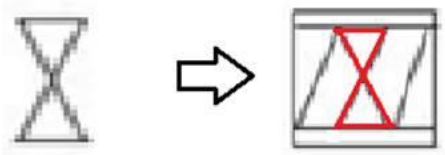
A. 

B. 

C. 

D. 

Ans. D
Sol.
Here the question figure is correctly embedded in the answer figure as shown below:



Hence, option D is correct answer.

20.If 683 is coded as FOX, 654 is FIN, 4581 is NIOS, then what will be the code of 654513?
A. FIXICN
B. FNINXC
C. FINISX
D. FINNCX

Ans. C
Sol.
On comparing the following:
F O X → 6 8 3
F I N → 6 5 4
N I O S → 4 5 8 1
We get,
F → 6, I → 5, N → 4, O → 8, S → 1, X → 3
So,
654513 → FINISX
Hence, option C is correct answer.

21.
Select the correct passive form of the given sentence.
The gardener has mowed the lawn.
A. The lawn was mowed by the gardener.
B. The lawn has been mowed by the gardener.
C. The lawn is mowed by the gardener.
D. The gardener has been mowed by the lawn.

Ans. B
Sol.
The following rules should be considered while changing active form to passive voice:
• The places of subject and object will be interchanged in the sentence.
• Only 3rd form of the verb or Past Participle will be used as a main verb in the Passive Voice.
Therefore, **option B** correctly provides the passive form of the given sentence.

22.
Select the most appropriate antonym of the given word.
SUCCINCT
A. pithy
B. terse
C. lengthy
D. curt

Ans. C
Sol.
The meanings of the words are:
Succinct(संक्षिप्त): (especially of something written or spoken) briefly and clearly expressed.
Pithy: (of a fruit or plant) containing much pith.
Terse(संक्षिप्त): sparing in the use of words; abrupt.
Lengthy(विस्तृत): (especially in reference to time) of considerable or unusual length, especially so as to be tedious.
Curt(रूखा): rudely brief.
Hence, **option C** is the correct answer.

23.Select the wrongly spelt word.
A. assurence
B. assurable
C. assure
D. assuredly

Ans. A

Sol.
'Assurance' meaning ' a positive declaration intended to give confidence; a promise.' is wrongly spelt as 'assurence'. Hence, **option A** is the correct answer.

Meaning of other words:
Assure(भरोसा दिलाना)= make certain in the future
Assuredly(नि:संदेह)= without a doubt

24.
Select the correct indirect form of the given sentence.
Mrs. Gupta said to me, "Why are these boys standing in the sum?"
A. Mrs. Gupta told me why those boys are standing in the sun.
B. Mrs. Gupta asked me why those boys were standing in the sun.
C. Mrs. Gupta said to me that why are these boys standing in the sun.
D. Mrs. Gupta asked me why were these boys standing in the sun.

Ans. B
Sol.
We notice that the reporting verb is in the Past tense ('said'). Hence, a change will be made in the tense of the reported speech.
Also, the first person of the reported speech is changed according to the subject of reporting speech.
In the given question, the verb 'are standing' is changed to 'were standing'.
Therefore, the sentence in Indirect Speech will be **option B** i.e. **Mrs. Gupta asked me why those boys were standing in the sun.**

25.
Select the most appropriate synonym of the given word.
INNUENDO
A. implication
B. evidence
C. verification
D. proof

Ans. A
Sol.
The meanings of the words are:
Innuendo(ताना): an allusive or oblique remark or hint, typically a suggestive or disparaging one.
Implication(आशय): the conclusion that can be drawn from something although it is not explicitly stated.
Evidence(सबूत): the available body of facts or information indicating whether a belief or proposition is true or valid.
Verification(जाँच): the process of establishing the truth, accuracy, or validity of something.
Proof(प्रमाण): evidence or argument establishing a fact or the truth of a statement.
Hence, **option A** is the correct answer.

26.
Select the most appropriate synonym of the given word.
HIND
A. near
B. rear
C. first
D. front

Ans. B
Sol.
The meanings of the words are:
Hind: (especially of a bodily part) situated at the back; posterior.
Near: at or to a short distance away; nearby.
Rear: the back part of something, especially a building or vehicle.

First: coming before all others in time or order; earliest; 1st.
Front: the side or part of an object that presents itself to view or that is normally seen or used first; the most forward part of something.
Hence, **option B** is the correct answer.

27.
Select the most appropriate word to fill in the blank.
In spite of being born in an _____ family, he chose to fight all odds and emerged as a notable statesman.
A. impeccable
B. immaculate
C. intelligent
D. impoverished

Ans. D
Sol.
Let's understand the meaning of the given words:

Impeccable(निर्दोष) = without fault or error

Immaculate(बेदाग) = completely neat and clean

The sentence implies that despite being born in a poor family, the subject emerged as a notable statesman.
'Impoverished' meaning '(of a person or area) made poor' is the apt fit for the blank.
Hence, **option D** is the correct answer.

28.
Given below are four jumbled sentences. Out of the given options pick the one that gives their correct order.
A) He often asked questions which were strange and witty.
B) Emperor Akbar was in the habit of putting riddles and puzzles to his courtiers.
C) Once he asked a strange question that a confused everyone.
D) It took much wisdom to answer these questions.
A. BADC
B. CABD
C. ABCD
D. BACD

Ans. A
Sol.
The first sentence should be B as it introduces the subject of the passage i.e. 'Emperor Akbar'. The sentence A should be the second sentence as it further explains the type of questions he used to ask. The sentence D is the third sentence since it further tells the skills courtiers required to answer his strange questions. The sentence C aptly concludes the passage.
Hence, **option A** i.e. **BADC** is the correct answer.

29.
Select the most appropriate meaning of the given idiom
Throw in the towel
A. face the situation
B. think of a solution
C. admit defeat
D. drop something

Ans. C
Sol.
The idiom 'throw in the towel' means 'to abandon a struggle; admit defeat'.
For example: 'There are times when the difficulties appear too great and we just throw in the towel'.
Hence, **option C** is the correct answer.

30.

Select the most appropriate meaning of the given idiom.
To air dirty linen in public
A. to discuss private affairs in public
B. to hang out clothes in the open
C. to continue to complain
D. to stand up and fight

Ans. A
Sol.
The idiom 'to air dirty linen in public' means 'to discuss very private, personal matters, especially that which may be sensitive or embarrassing, in public or with other people'.
For example: The captain refuses to air the team's dirty laundry in public.
Hence, **option A** is the correct answer.

31.
Direction: Select the segment in the sentence, which contains the grammatical error.
Did you know whether we can exchange the dress if my sister doesn't like it?
A. doesn't like it
B. we can exchange the dress
C. if my sister
D. Did you know whether

Ans. D
Sol. Option D has the grammatically incorrect part. The whole sentence is in the simple present tense. The use of 'did' makes it erroneous. Thus, replace 'did' with 'do' to make the sentence grammatically sound.

32.
Direction: Select the most appropriate meaning of the underlined idiom in the given sentence.
A lot of work has gone on behind the scenes for the special event which is being planned next week.
A. Unknown to everyone
B. To complete the arrangements
C. For spreading the news
D. In the theatre

Ans. A
Sol. The idiom 'behind the scenes' means something that is working or happening privately without being known or seen by the public.
e.g. A lot of hard work has been going on behind the scenes.
Hence, option A is the correct answer.

33.
Direction: Given below are four jumbled sentences. Select the option that gives their correct order.
P. "It is mine. I saw it first," claimed one cat.
Q. Suddenly they spotted a loaf of bread lying beneath a tree.
R. Once upon a time, two cats were passing through a street.
S. Both pounced upon it and caught the loaf at the same time.
A. SQRP
B. QPSR
C. RQSP
D. PSQR

Ans. C
Sol. The passage will start with R as it starts the story (and tells us about two cats). The use of pronoun 'they' used in Q is for those two cats (mentioned in R); thus, it will come next in the sequence. The pronoun 'it' used in S is for the loaf of bread (that was spotted by the two cats in Q). This makes QS a mandatory pair. The sequence RQSP is given in option C. Hence, it is the correct answer.

34.

Direction: 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.
One of the most fascinating archaeological sites in Maharashtra, the Ellora Caves, date back (1)_____ about 1,500 years ago, and (2)_____ the epitome of Indian rock-cut architecture. (3)_____ 34 caves are actually Buddhist, Hindu and Jain religious monuments (4)_____ in the rock. They were given the (5)_____ of World Heritage Site in 1983. Created between the 6th and 10th century, the 12 Buddhist, 17 Hindu and 5 Jain caves carved in proximity at Ellora are proof of the religious harmony prevalent during this period of Indian history.

Select the most appropriate option to fill in blank No.5 A. symbol
B. role
C. status
D. function

Ans. C
Sol. World Heritage sites are natural or man-made sites, areas, or structures recognized as being of outstanding international importance and therefore as deserving special protection. Sites are nominated and designated by the World Heritage Convention (an organization of UNESCO). It is a status given to some specific places. Hence, option C is the correct answer.

35.Select the most appropriate option to fill in blank No.4
A. carved
B. created
C. erected
D. constructed

Ans. A
Sol. The verb 'carve' means to make something by cutting into especially wood or stone, or to cut into the surface of stone, wood, etc. This is the only verb that will go with the text (caves). E.g. Some of the tunnels in the cliff are natural, some were carved out (= cut into the rock) by soldiers for defensive purposes. Hence, option A is the correct answer.

36.Select the most appropriate option to fill in blank No.3
A. An
B. Many
C. Few
D. The

Ans. D
Sol. The blank needs a determiner for the 34 caves of Ellora. Those are specific caves (as they have already been discussed). Thus, we will use the article 'the' before '34 caves'. Hence, option D is the correct answer.

37.Select the most appropriate option to fill in blank No.2
A. are
B. were
C. be
D. is

Ans. A
Sol. The noun for which we have to choose the verb is "Ellora caves". It is a plural noun. Also, the sentence will be in the simple present tense. Hence, option A is the correct answer.

38.
Select the most appropriate option to fill in blank No.1
A. to
B. at

C. for
D. in

Ans. A
Sol. The correct preposition here will be 'to' as the idiom "date back to" means to have been made in or to have come into being in (a certain time in the past).
e.g. They found jewelry dating back to the 1700s.
Hence, option A is the correct answer.

39.
Select the most appropriate option to fill in the blank.
Several environmentalists from the city conducted a meet to discuss issues related to the _____ pollution levels created by the growing number of pharmaceutical companies.
A. raise in
B. rising from
C. raising of
D. rise in

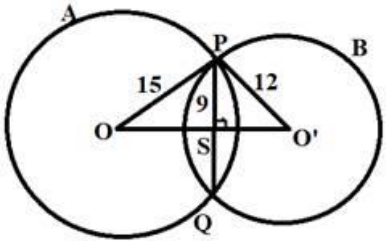
Ans. D
Sol. The sentence talks about how the growing number of pharmaceutical companies is affecting the pollution level. Clearly, the pollution level will rise (as the companies grow). The correct verb here will be 'rise'. The preposition that will come with it will be 'in'. See the usage of the two prepositions below:
1) There has been a sharp rise in the number of people out of work.
2) Smoke was rising from the chimney.
Hence, option D is the correct answer.

40.Select the word with the incorrect spelling.
A. Quantity
B. Argument
C. Quarrell
D. Aisle

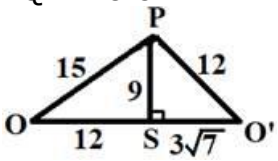
Ans. C
Sol. Option C has the incorrectly spelt word. The correct spelling is "quarrel" and it means an angry argument or disagreement.
Other words and their meanings are:
Quantity = a number or an amount of something
Argument = an angry discussion between two or more people who disagree with each other
Aisle = a passage between the rows of seats in a church, theatre, etc.

41.
Two circles of radii 15 cm and 12 cm intersect each other, and the length of their common chord is 18 cm. What is the distance (in cm) between their centres?
A. 18 + √7
B. 15 + √7
C. 12 + 2√7
D. 12 + 3√7

Ans. D
Sol.



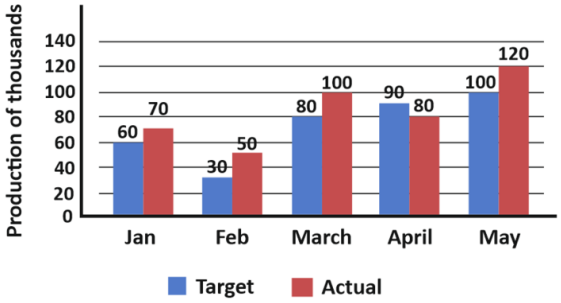
Let circle A and B with centre O and O' having radii 15cm and 12cm respectively. PQ is the common chord.
PQ = 18 cm



OS = 12
SO' = 3√7

Then, OO' = OS + SO' = 12 + 3√7

42.The given Bar Graph presents the Target and Actual production of AC Machines (numbers in thousands) of a factory over five months.



The total target production of AC Machines in February, April and May was what percentage less than the total actual production of AC Machines over all the five months (correct to one decimal place)?
A. 46.2%
B. 46.8%
C. 47.1%
D. 47.6%

Ans. D
Sol.
Total target production of AC machines in Feb, Apr & May
$= 30 + 90 + 100 = 220$
Total actual production of AC machines in all 5 months
$= 70 + 50 + 100 + 80 + 120$
$= 420$

$$\%Less = \frac{420 - 220}{420} \times 100$$

$$= \frac{200}{420} \times 100 = 47.61\%$$

43.The volume of a right circular cone is 924 cm^3. If its height is 18 cm, then the area of its base (in cm^2) is:
A. 154
B. 132
C. 176
D. 198

Ans. A
Sol.

$$Volume = \frac{1}{3}\pi r^2 h$$

924 = (1/3)Πr²×18

Πr² = 154 cm^2

44.If 30 persons take 10 days to complete a certain work working 8 hours a day, then 40 persons should work how many hours a day so that the work is completed in 6 days?
A. 6
B. 10
C. 8
D. 12

Ans. B
Sol.

Let it takes H_2 hours per day to complete the work.

$$\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$$

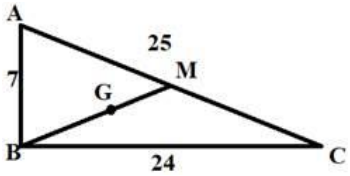
$$30 \times 10 \times 8 = 40 \times 6 \times H_2$$

$$H_2 = 10\ hours.$$

45.In Triangle ABC, AB = 7 cm, BC = 24 cm and AC = 25 cm. If G is the centroid of the triangle, then what is the length (in cm) of BG?
A. 10
B. $8\frac{1}{3}$
C. $8\frac{2}{3}$
D. 9

Ans. B
Sol.

AB = 7 cm, BC = 24 cm and AC = 25 cm.



It is a right-angle triangle as $AB^2 + BC^2 = AC^2$

Let G is the centroid of the given triangle and BM is the median.

BM = half of the hypotenuse = 25/2

Centroid always divides the median in the ratio of 2 : 1.

Then, BG = (2/3)×BM

BG $= \frac{2}{3} \times \frac{25}{2} = \frac{25}{3}$

46.There are 90 students in a class, out of which 70% are from village A and others are from village B. The average score of students from village B in a test is 20% more than that from village A. If the average score of all the students is 53, then what is the average score of the students from village B?

A. 54
B. 60
C. 64
D. 50

Ans. B

Sol.

Total students $= 90$

70% from village A $= 90 \times \frac{70}{100} = 63$

Village B $= 27$

Let The average score of students from village A $= 5x$

Then the average score of students from village B $= 5x \times \frac{120}{100} = 6x$

A.T.Q.

$27 \times 6x + 63 \times 5x = 90 \times 53$

$162x + 315x = 4770$

$477x = 4770$

$x = 10$

Average score of students from village B $= 6x = 6 \times 10$

$= 60.$

47.A person sold an article at a loss of 8%. Had he sold it at a gain of 10.5%, he would have received Rs. 37 more. What is the cost price of the article?

A. Rs. 200
B. Rs. 250
C. Rs. 240
D. Rs. 210

Ans. A

Sol.

Loss = 8%

Let CP $= 100$

C.P S.P

$100 \quad 92$

$100 \quad 110.5 \rangle 37\ more$

$110.5 - 92 = 18.5 \rightarrow 37$

$100 = \frac{37}{18.5} \times 100$

$= ₹\ 200.$

48.The ratio of the incomes of A and B is 2 : 3 and that of their expenditure is 1 : 2. If 90% of B's expenditure is equal to the income of A, then what is the ratio of the savings of A and B?

A. 1 : 1
B. 9 : 8
C. 8 : 7
D. 3 : 2

Ans. C

Sol.

A B

Income $2x \ 3x$

Expenditure $y \ 2y$

Saving $2x - y\ 3x - 2y$
A.T.Q.
90% of B's Expen. $=$ Income of A
$\frac{9}{10} \times 2y = 2x$
$\frac{y}{x} = \frac{10}{9}$
Saving ratio –
$= \frac{2x - y}{3x - 2y}$
$= \frac{x\left(2 - \frac{y}{x}\right)}{x\left(3 - 2\frac{y}{x}\right)}$
$= \frac{2 - \frac{10}{9}}{3 - 2 \times \frac{10}{9}}$
$= 8/7.$

49. $\frac{(\sec\theta + \tan\theta)(1 - \sin\theta)}{\text{cosec}\,\theta(1 + \cos\theta)(\text{cosec}\,\theta - \cot\theta)}$ is equal to:
A. sin q
B. sec q
C. cos q
D. cosec q

Ans. C
Sol.
$$\frac{(\sec\theta + \tan\theta)(1 - \sin\theta)}{\text{cosec}\,\theta(1 + \cos\theta)(\text{cosec}\,\theta - \cot\theta)}$$
$$= \frac{\left(\frac{1}{\cos\theta} + \frac{\sin\theta}{\cos\theta}\right)(1 - \sin\theta)}{\frac{1}{\sin\theta}(1 + \cos\theta)\left(\frac{1}{\sin\theta} - \frac{\cos\theta}{\sin\theta}\right)}$$
$$= \frac{1}{\cos\theta} \frac{(1 + \sin\theta)(1 - \sin\theta)}{\frac{1}{\sin\theta} \times \frac{1}{\sin\theta}(1 + \cos\theta)(1 - \cos}$$
$\{\because 1 - \cos^2\theta = \sin^2\theta$
$\& 1 - \sin^2\theta = \cos^2\theta\}$
$$= \frac{\cos^2\theta}{\cos\theta \times \frac{1}{\sin^2\theta} \times \sin^2\theta}$$
$= \cos\theta.$

50.Two trains of same length are running on parallel tracks in the same direction at 54 km/h and 42 km/h respectively. The faster train passes the other train in 63 seconds. What is the length (in metres) of each train?
A. 90
B. 81
C. 105
D. 210

Ans. C
Sol.
Let A and B are two trains running in the same direction with speed of 54 kmph and 42 kmph respectively.
Let x be the length of each train.
Relative speed $= (54 - 42)_{\text{kmph}} =$
$= 12\ \text{kmph} = 12 \times \frac{5}{18}\text{m/s}$
$Time = \frac{Distance}{Speed}$
$63 = \frac{x + x}{12 \times \frac{5}{18}}$
$x = \frac{63 \times 12 \times 5}{2 \times 18}$
$= 105\ \text{meter.}$

51.If $a^2 + 4b^2 + 49c^2 + 18 = 2(2b + 28c - a)$, then the value of $(3a + 2b + 7c)$ is:
A. 0
B. 2
C. 1
D. 3

Ans. B

Sol.

$a^2 + 4b^2 + 49c^2 + 18 = 4b + 56c - 2a$

$a^2 + 2a + 4b^2 - 4b + 49c^2 - 56c + 18 = 0$

$(a^2 + 2a + 1) + (4b^2 - 4b + 1) + (49c^2 - 56c + 16) = 0$

$(a + 1)^2 + (2b - 1)^2 + (7c - 4)^2 = 0$

a = -1

b = 1/2

c = 4/7

$3a + 2b + 7c = 3 \times (-1) + 2 \times \frac{1}{2} + 7 \times \frac{4}{7}$

= -3 + 1 + 4 = 2

52.If $\cos^2 q - \sin^2 q - 3\cos q + 2 = 0$, $0° < q < 90°$, then what is the value of $4\text{cosec}q + \cot q$?

A. $3\sqrt{3}$

B. 4

C. $4\sqrt{3}$

D. 3

Ans. A

Sol.

$\cos^2\theta - \sin^2\theta - 3\cos\theta + 2 = 0$

$\cos^2\theta - (1 - \cos^2\theta) - 3\cos\theta + 2 = 0$

$2\cos^2\theta - 3\cos\theta + 1 = 0$

$2\cos^2\theta - 2\cos\theta - \cos\theta + 1 = 0$

$2\cos\theta(\cos\theta - 1) - 1(\cos\theta - 1) = 0$

$(\cos\theta - 1)(2\cos\theta - 1) = 0$

$\cos\theta - 1 = 0$

$\cos\theta = 1 = \cos 0°$

$2\cos\theta - 1 = 0$

$\cos\theta = \frac{1}{2} = \cos 60°$

$\theta = 0°, 60°$

But $\theta > 0°$,

Then, take $\theta = 60°$

$4\text{cosec}\,\theta + \cot\theta$

$= 4\text{cosec}\,60° + \cot 60°$

$= 4 \times \frac{2}{\sqrt{3}} + \frac{1}{\sqrt{3}} = \frac{9}{\sqrt{3}}$

$= 3\sqrt{3}.$

53.A man walks from point X to Y at speed of 20 km/h, but comes back from point Y to X at a speed of 25 km/h. Find his average speed (in km/hr).

A. $22\frac{2}{9}$

B. $24\frac{2}{9}$

C. $23\frac{2}{9}$

D. $25\frac{2}{9}$

Ans. A

Sol. A man walks from point X to Y at speed of 20 km/hr, but comes back from point Y to X at a speed of 25 km/hr.

Clearly, Distance is the same while going from X to Y and while coming back from Y to X.

Hence, Average Speed = $\frac{2AB}{A+B} = \frac{2 \times 20 \times 25}{20 + 25} = \frac{1000}{45} = \frac{200}{9} = 22\frac{2}{9}$ Km/hr

54.The difference of simple interest on sum of money for 8 years and 10 years is ₹200. If the rate of interest is 10% p.a, then what is the sum of money?

A. Rs. 1600

B. Rs. 1000

C. Rs. 1200

D. Rs. 1400

Ans. B

Sol. Let Principal = Rs. x

Rate of interest = 10% p.a

A.T.Q.

$\Rightarrow \frac{x \times 10 \times 10}{100} - \frac{x \times 10 \times 8}{100} = \text{Rs.}200$

$$\Rightarrow \frac{x \times 10 \times (10-8)}{100} = Rs.200$$
$$\Rightarrow x = Rs.1000$$

Hence, sum of money = Rs. 1000

55.Which of the following numbers will completely divide $7^{81} + 7^{82} + 7^{83}$?
A. 389
B. 399
C. 387
D. 397

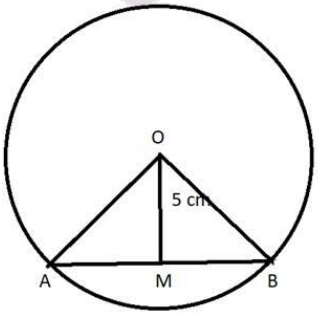
Ans. B
Sol. Consider $7^{81} + 7^{82} + 7^{83}$

$$\Rightarrow 7^{81}(1+7+7^2)$$
$$\Rightarrow 7^{81}(57)$$
$$\Rightarrow 7^{80}(399)$$

Hence, $7^{81} + 7^{82} + 7^{83}$ is completely divisible by 399.

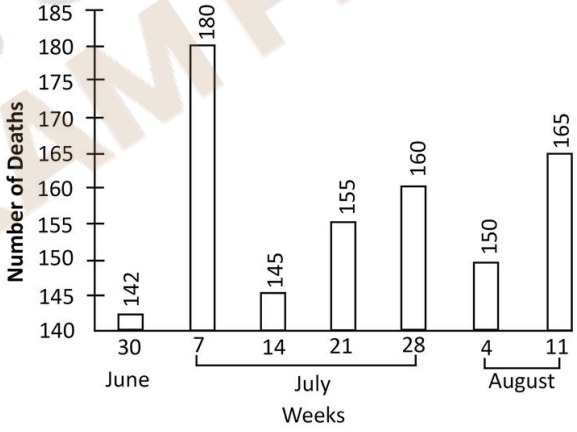
56.A 5 cm long perpendicular is drawn from the centre of a circle to a 24 cm long chord. Find the diameter of the circle.
A. 26 cm
B. 32 cm
C. 13 cm
D. 30 cm

Ans. A
Sol. A 5 cm long perpendicular is drawn from the centre of a circle to a 24 cm long chord.



Here, OM is perpendicular to AB.
⇒ OA = OB (Radius of the same circle)
⇒ OM = OM (common)
Hence, ΔAOM ≈ ΔBOM
⇒ AM = BM
But AB = 24 cm
Hence, AM = 12 cm
In right angled triangle AMO,
$\Rightarrow AO^2 = OM^2 + AM^2$
$\Rightarrow AO^2 = (5)^2 + (12)^2 = 25 + 144 = 169$
⇒ AO = 13 cm
Hence, Radius of the circle = 13 cm
Therefore, Diameter of the circle = 2 × 13 = 26 cm

57.
Direction: The following bar graph shows the number of deaths from road accidents that occurred during the rainy season in the year 1992. Study the graph carefully and answer the question.



Between which two consecutive weeks was the rise in the number of deaths the greater? A. 4 August to 11 August
B. 30 June to 7 July
C. 14 July to 21 July
D. 21 July to 28 July

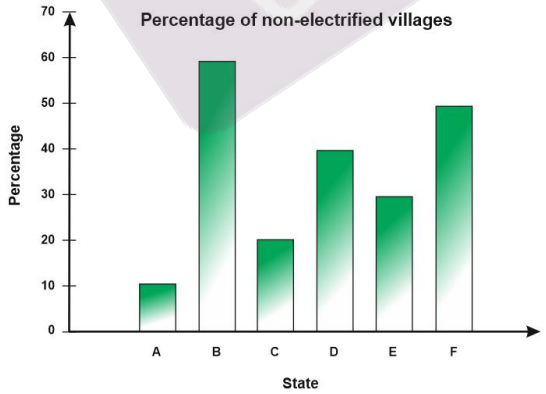
Ans. B
Sol. Rise in the number of deaths 4 August to 11 August = 165 – 150 = 15

Rise in the number of deaths 30 June to 7 July =180 – 142 = 38
Rise in the number of deaths 14 July to 21 July =155 – 145 = 10
Rise in the number of deaths 21 July to 28 July =160 – 155 = 5
Hence, Rise in the number of deaths is greater from 30 June to 7 July.

58.
Between which two consecutive weeks was the fall in the number of deaths the greatest?
A. 7 July to 14 July
B. 21 July to 28 July
C. 30 June to 7 July
D. 28 July to 4 August

Ans. A
Sol. Fall in the number of deaths from 7 July to 14 july = 180 – 145 = 35
Fall in the number of deaths from 28 July to 4 August = 160 – 150 = 10
Hence, Fall in the number of deaths the greatest from 7 July to 14 July.

59.
Direction: The given bar graph represents the Percentage of non-electrified villages in 6 states A, B, C, D, E and F. Study the graph and answer the question that follows.



How many states have at most 30% or less non-electrified villages?
A. 3
B. 2
C. 1
D. 4

Ans. A
Sol. Percentage of non- electrified villages in state A = 10
Percentage of non- electrified villages in state B = 60
Percentage of non- electrified villages in state C = 20
Percentage of non- electrified villages in state D = 40
Percentage of non- electrified villages in state E = 30
Percentage of non- electrified villages in state F = 50
Clearly, state A, C and E have at most 30% or less non-electrified villages
Hence, Required number of states = 3

60.If $\sec^2 x - 3\sec x + 2 = 0$, then the value of x ($0 < x < 90^\circ$) is:
A. 30°
B. 15°
C. 60°
D. 45°

Ans. C
Sol. Consider $\sec^2 x - 3\sec x + 2 = 0$
$\Rightarrow \sec^2 x - 2\sec x - \sec x + 2 = 0$
$\Rightarrow \sec x(\sec x - 2) - 1(\sec x - 2) = 0$
$\Rightarrow (\sec x - 2)(\sec x - 1) = 0$
$\Rightarrow \sec x = 2$ or $\sec x = 1$
If $\sec x = 2$ then $x = 60^\circ$
If $\sec x = 1$ then $x = 0^\circ$
But $0 < x < 90^\circ$
Hence, $x = 60^\circ$

61.If $a^3 + b^3 = 20$ and $a + b = 5$, then find the value of $a^4 + b^4$.
A. 26
B. 23

C. 25
D. 24

Ans. B
Sol. Given, $a^3 + b^3 = 20$ and $a + b = 5$
We know that $x^3 + y^3 = (x + y)(x^2 + y^2 - xy)$

So, $a^3 + b^3 = (a + b)(a^2 + b^2 - ab) = 20$
$\Rightarrow 5(a^2 + b^2 - ab) = 20$
$\Rightarrow a^2 + b^2 - ab = 4$ ..... (1)
Consider $a + b = 5$
Squaring both sides:
$a^2 + b^2 + 2ab = 25$ ..... (2)
On subtract equation (1) from equation (2):
$\Rightarrow 3ab = 21$
$\Rightarrow ab = 7$ ..... (3)
On putting the value of ab in equation (1):
$\Rightarrow a^2 + b^2 - 7 = 4$

$\Rightarrow a^2 + b^2 = 11$
Now, Squaring both sides:
$\Rightarrow a^4 + b^4 + 2a^2b^2 = 121$
$\Rightarrow a^4 + b^4 + 2(7)^2 = 121$

$\Rightarrow a^4 + b^4 + 98 = 121$

$\Rightarrow a^4 + b^4 = 23$

62.If $\text{cosec}\theta + \cot\theta = 2$, then $\sin\theta$ is:
A. 4/5
B. 2/5
C. 3/5
D. 3/4

Ans. A
Sol. Given, $\text{cosec}\theta + \cot\theta = 2$.....(1)
We know that, $\text{cosec}^2\theta - \cot^2\theta = 1$
$\Rightarrow$
$(\text{cosec}\theta + \cot\theta)(\text{cosec}\theta - \cot\theta) = 1$
Put the value from (1)

$\Rightarrow \text{cosec}\theta - \cot\theta = \frac{1}{2}$.....(2)
Adding (1) and (2)
$\Rightarrow 2\,\text{cosec}\theta = \frac{5}{2}$
$\Rightarrow \text{cosec}\theta = \frac{5}{4}$
$\Rightarrow \sin\theta = \frac{4}{5}$

63.A batsman in his 11th inning makes a score of 77 runs, thereby increasing his average scores by 3. What is his average score after the 11th inning?
A. 46
B. 47
C. 48
D. 49

Ans. B
Sol. A batsman in his 11th inning makes a score of 77 runs.
Let average score after the 11th inning = x
Average score before the 11th inning = (x-3)
A.T.Q.
$\Rightarrow 10(x-3) + 77 = 11x$
$\Rightarrow 10x - 30 + 77 = 11x$
$\Rightarrow x = 47$
Hence, Average score after the 11th inning = 47

64.Who among the following was the first Sayyid ruler of Delhi?
A. Mubarak Shah
B. Alam Shah
C. Muhammad Shah
D. Khizr Shah

Ans. D
Sol.
• **The Sayyid Dynasty was founded by Khizr Khan**.

• Khizr Khan was the governor of Multan and Timur's deputy in India.

• This dynasty ruled for 37 years from 1414 to 1451 AD by four rulers- Khizr Khan, Mubarak, Muhammad Shah, Alam Shah.

65.Which of the following states share the longest boundary with China?
A. Sikkim
B. Arunachal Pradesh
C. Himachal Pradesh
D. Uttrakhand

Ans. B
Sol.
• **Arunachal Pradesh** shares the longest boundary with China.
• China and Arunachal Pradesh share a border, which is called **McMahon Line**.
• The state also borders Bhutan, Myanmar, Assam and Nagaland.

66.The joint process of vapourisation and condensation is called _____.
A. Sublimation
B. Chromatography
C. Distillation
D. Crystallisation

Ans. C
Sol.
• The joint process of vapourisation and condensation is called **Distillation**.
• Distillation is the process of separating the components or substances from a liquid mixture by using selective boiling and condensation.

67.Which of the following metals has an ore named 'Galena'?
A. Nickel
B. Copper
C. Iron
D. Lead

Ans. D
Sol.
• **Galena** is the main ore of **lead**.
• It is used since ancient times.
• It typically forms in low-temperature sedimentary deposits.
• Galena is the natural mineral form of lead(II) sulfide (PbS).
• It is the most important ore of lead and an important source of silver

68.The Bhupen Hazarika Setu, also called Dhola-Sadiya Bridge connects Assam and _____.
A. Sikkim
B. Meghalaya
C. West Bengal
D. Arunachal Pradesh

Ans. D
Sol.
• The Bhupen Hazarika Setu is also called **Dhola-Sadiya Bridge.**
• It connects **Assam and Arunachal Pradesh.**
• • It was dedicated to the nation in May 2017.

69.Panchavati, a key part of the Valmiki Ramayana is located in which state of India?
A. Tamil Nadu
B. Uttar Pradesh
C. Maharashtra
D. Uttarakhand

Ans. C
Sol.
• Panchavati, a key part of the Valmiki Ramayana is located in **Nashik**, **Maharashtra**.
• It is an ancient holy city.

• The Ramayana is an ancient Indian epic, composed some time in the 5th century BCE, about the exile and then return of **Rama**, **prince of Ayodhya.**
• It was composed in **Sanskrit by the sage Valmiki.**

70.Rani-ki-Vav (the Queen's Stepwell), which is in the UNESCO World Heritage List, is located in which state?
A. Madhya Pradesh
B. Gujarat
C. Uttar Pradesh
D. Rajasthan

Ans. B
Sol.
• **Rani ki Vav** is a stepwell situated in the town of **Patan in Gujarat**.
• It is located on the banks of **Saraswati river**.
• It was rediscovered in **1940s and restored in 1980s by the Archaeological Survey of India**.
• It has been listed as one of UNESCO's World Heritage Sites since 2014.
• It was constructed during the rule of the **Chaulukya dynasty**.

71.During the passage of the Royal Titles Act 1876, the office of the British Prime Minister was occupied by _____.
A. William Eward Gladstone
B. Arthur Balfour
C. John Russell
D. Benjamin Disraeli

Ans. D
Sol.
• The Royal Titles Act 1876 was an Act of the Parliament of the United Kingdom.
• This act officially recognized Queen Victoria as "Empress of India".
• This title had been assumed by her in 1876, under the encouragement of the **Prime Minister Benjamin Disraeli**.

72.What is the full form of GSTIN in relation of GST?
A. Goods and Services Tax Identification Note
B. Goods and Services Tax Identification Number
C. Goods and Service Tax Information Number
D. Goods and Services Taxation Income Number

Ans. B
Sol.
• **GSTIN** stands for Goods and Service Tax Identification Number.
• It is a 15-digit alpha-numeric PAN-based unique code.
• It is allocated to every GST-registered person.

73.Which of the following terms refers to the running down or payment of a loan in instalments?
A. Discounted cashflow
B. Credit creation
C. Backwardation
D. Amortisation
E. None of these

Ans. D
Sol.
• In business, **amortization** refers to spreading payments over multiple periods.
• The term is used for two separate processes: amortization of loans and amortization of assets.

74.Which of the following are the highest-frequency electro magnetic waves?
A. Gamma Rays

B. Radio Waves
C. Ultraviolet Rays
D. Microwaves

Ans. A
Sol.
• **Gamma rays** have the highest energies, the shortest wavelengths, and the highest frequencies.
• **Radio waves**, on the other hand, have the lowest energies, longest wavelengths, and lowest frequencies of any type of electro magnetic radiation.

75.In which year was UNICEF founded ?
A. 1949
B. 1948
C. 1945
D. 1946

Ans. D
Sol.
• UNICEF was **founded in 1946**.
• It was **created by the United Nations General Assembly**.
• The **full form of UNICEF** is the **United Nations Children's Fund**.

76._____ is the tube that carries urine from the kidney to the urinary bladder.
A. Sphincter
B. Urethra
C. Ureter
D. Aorta

Ans. C
Sol.
• **Ureter is the tube that carries urine from the kidney to the urinary bladder**.
• There are **two ureters, one attached to each kidney**.
• It is **10 to 12 inches long** in the average adult.

77.'Mekhela Chador' is a traditional dress from the state of :
A. Odisha
B. West Bengal
C. Assam
D. Tripura

Ans. C
Sol.
• **'Mekhela Chador' is a traditional dress from Assam**.
• There are two main pieces of dress:
1) **Mekhela**
2) **Chador**
• It can be made with **Cotton, Muga, Pat silk** and **Eri silk**.

78.'Mekhela Chador' is a traditional dress from the state of :
A. Odisha
B. West Bengal
C. Assam
D. Tripura

Ans. C
Sol.
• **'Mekhela Chador' is a traditional dress from Assam**.
• There are two main pieces of dress:
1) **Mekhela**
2) **Chador**
• It can be made with **Cotton, Muga, Pat silk** and **Eri silk**.

79.'Nibble' in computer terminology is also called_____.
A. Half bit
B. Byte
C. Bit
D. Half byte

Ans. D
Sol.
• **'Nibble' in computer terminology is also called Half Byte**.

• It has **sixteen possible values**.
• It can be **represented by a single hexadecimal digit**.

80.Which of the following is a water-soluble vitamin?
A. Vitamin D
B. Vitamin A
C. Vitamin C
D. Vitamin K

Ans. C
Sol.
• **Vitamin C is a water-soluble vitamin**.
• **Vitamin B** is also a **water-soluble vitamin**.
• **Water-soluble vitamins** are carried to the body's tissues but are not stored in the body.

81.Which is the largest river island in the world ?
A. Srirangam Island
B. Majuli Island
C. Bhavani Island
D. Agatti Island

Ans. B
Sol.
• **Majuli Island is the largest river island in the world**.
• It became the **first island to be made a district in India**.
• It is **formed by the Brahmaputra River**.

82.In which city is Indian Railway-Rail Coach Factory located?
A. Bengaluru
B. Kapurthala
C. Chennai
D. Chittaranjan

Ans. B
Sol.
• **Indian Railway - Rail Coach Factory is located in Kapurthala**.
• It is **located on** the **Jalandhar-Firozpur railway line**.
• It was **established in 1986**.

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