# NATIONAL TALENT SEARCH EXAMINATION <br> (NTSE 2021) STAGE-1 

STATE : Odisha PAPER : MAT
Date : 13/12/2020
Max. Marks :100 SOLUTIONS Time : 120 mins.

Question 1. In 3 of the options, the second word is related to the first word in the same logical way. Which is the odd one out?
a. CREATE : ETAERC
b. CATALYST : TSYLATAC
c. GREAT : EATRG
d. SNAKE : EKANS

Answer: (c)

Solution:
a.


C.
X


Question 2. I was facing west. I turned $45^{\circ}$ in the anti-clockwise direction, then $180^{\circ}$ in the clockwise direction. Finally I turned $90^{\circ}$ in the anti-clockwise direction. Which direction am I facing now?
a. South West
b. South
c. North
d. North West

Answer: (d)

Solution:

(0) initial position
(3) Final position
[3] $\Rightarrow$ North West direction

Question 3. Among the given group of 4 images, which set of images can be classified as a group?

a. $(1,2,3)$
b. $(1,2,4)$
c. $(1,3,4)$
d. $(2,3,4)$

Answer: (b)

Solution:


Clearly $(1,2,4)$ make a group.

Question 4. Among the given group of 4 images, which set of images can be classified as a group?

a. $(1,2,3)$
b. $(1,2,4)$
c. $(1,3,4)$
d. $(2,3,4)$

Answer: (b)

Solution:

In 1, 2 \& 4 the dotted line intersects two vertices of the polygon. In 3 the dotted line touches the sides instead of vertices.

So, $(1,2,4)$ have the same characteristics.

Question 5. In which of the four images on the right can the pattern given on the left be seen as a part of the image?

a. 1
b. 2
c. 3
d. 4

Answer: (c)

Solution:

So, the left side image is present in (3), excluding the oval at the bottom.


Question 6. Using the letters in the words DICE and BOUNCE, the name of a three dimensional figure can be formed. What it would be?
a. SPHERE
b. CUBOID
c. CYLINDER
d. PYRAMID

Answer: (b)

Solution:

$\Rightarrow$ CUBOID

Question 7. Which of the following figures will complete the figural series given below?

d.


Answer: (d)

Solution:
From the last three images of the pattern, it is concluded that T should be on the top left corner. Also, from the last three images, the star should be at the top right corner. Hence, the completed pattern is:

New


Remove A


B

New


Remove C

Remove


D New

The given pattern is incomplete to some extent, however, the answer can be arrived at using only B and C .
From B and C
$1=5$ = ' T ',
$5=3=$ 'o'
$3=1=C$
From A and B
6 = New = "star"


Question 8. Select one of the following four options that will make the second pair analogous to the first pair given as:
Circle : Circumference :: Polygon : ?
a. Perimeter
b. Volume
c. Area
d. Diagonal

Answer: (a)

Solution:

## Circle: Circumference :: Polygon : Perimeter

We know that the length of the boundary of a circle is called circumference and the length of the boundary of a polygon is called a perimeter.

Question 9. If in a particular coding pattern the word MOBILITY is written as 46293927, then the word EXAMINATION can be written as
a. 67250623076
b. 56149512965
c. 45038401854
d. 57159413955

Answer: (b)

Solution:


EXAMINATION $=56149512965$

Question 10. What is the missing term in the series given below?

$$
2,5,10, \text { ?, } 36
$$

a. 17
b. 19
c. 25
d. 28

Answer: (b)

Solution:
$2^{1}+0 \rightarrow 2$
$2^{2}+1 \rightarrow 5$
$2^{3}+2 \rightarrow 10$
$2^{4}+3 \rightarrow 19$ (Required number)
$2^{5}+3 \rightarrow 36$

Question 11. John walked 11 m to the north, then he turns North East and walks $21 \sqrt{2} \mathbf{m}$, next he moves $135^{\circ}$ clockwise and moves $\mathbf{2 7 m}$. Finally, he turns right and moves 16 m . How far is he from his starting point?
a. $5 \sqrt{2}$
b. $6 \sqrt{2}$
c. $7 \sqrt{2}$
d. $8 \sqrt{2}$

Answer: (a)

Solution:

The path traversed by John is along the lengths represented by $A B, B C, C D, D E$. $D C=27 \mathrm{~m}, \mathrm{AB}=11 \mathrm{~m}$. Therefore, $\mathrm{PB}=27-11=6 \mathrm{~m}$
$A P=11-6=5 \mathrm{~m}$ and $\mathrm{CQ}=27-6=21 \mathrm{~m}$
$B C=21 \sqrt{2}$. So, $B Q=21 \mathrm{~m}$ as well.
$P E=21-16=5 \mathrm{~m}$
By Pythagoras theorem
$A E=\sqrt{5^{2}+5^{2}}$
$A E=5 \sqrt{2}$


Question 12. Among the given group of 4 images, which set of images can be classified as a group?

a. $(1,2,3)$
b. $(1,2,4)$
c. $(1,3,4)$
d. $(2,3,4)$

Answer: (c)

Solution:


Both internal triangles are on the same side in 1, 3, 4 but on different sides in 2 .
$\Rightarrow 1,3,4$ make the same group

Question 13. In a certain code language "BOY IS GOOD" is coded as "QUO CUI HEER", "SITA IS FAIR" is coded as "LAI QUO MEA", "ALL ARE FAIR" is coded as "RUO LEV MEA" "DOG WAS GOOD" is coded as "SI HAI CUI". What is the code for the word "BOY"?
a. QUO
b. LAI
c. CUI
d. HEER

Answer: (d)

Solution:

BOY IS GOOD $\rightarrow$ QUO CUI HEER

SITA IS FAIR $\rightarrow$ LAI QUO MEA
ALL ARE FAIR $\rightarrow$ RUO LEV MEA
DOG WAS GOOD $\rightarrow$ SI HAI CUI $\qquad$
By observation,
IS $\rightarrow$ QUO $\quad$ (from (1) and (2))
GOOD $\rightarrow$ CUI $\quad$ (from (1) and (4))
BOY $\rightarrow$ HEER

Question 14. What is the next term in the sequence given below?
$32,39,46,117,202,365,684$, ?
a. 1206
b. 1251
c. 1368
d. 1391

Answer: (b)

Solution:


Question 15. Which of the answer images has the question image embedded and hidden inside?
QUESTION IMAGE

a. A
b. B
c. C
d. D

Answer: (c)

Solution:


In image C the question image is embedded.

Question 16. Among the given group of 4 images, which set of images can be classified as a group?

a. $(1,2,3)$
b. $(1,2,4)$
c. $(1,3,4)$
d. $(2,3,4)$

Answer: (a)

Solution:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $Z$ | Y | X | W | V | U | T | S | R | Q | P | O | N |


| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| M | L | K | J | I | H | G | F | E | D | C | B | A |

In reverse order of the alphabet, X stands at number $3, \mathrm{~B}$ at $25, \mathrm{~K}$ at 16 and P at 11 (NOT at 10). So, $1,2 \& 3$ will make a group.

Question 17. Select one of the following four options that will make the second pair analogous to the first pair given as:

CACTUS: CACSUT :: BUZZER : ?
a. REZZUB
b. UZZBER
c. ZUBREZ
d. UZEZBR

Answer: (c)

Solution:


Question 18. What is the next term in the sequence given below?

$$
3,19,163,1459, ?
$$

a. 13231
b. 13213
c. 13321
d. 13123

Answer: (d)

Solution:


Question 19. What is the missing number in the given series?

$$
2,4,7,12,19, ?, 43
$$

a. 28
b. 30
c. 32
d. 29

Answer: (b)

Solution:


Question 20. In a certain code language "STUDENT ATTENDS CLASS" is coded as "CHIP DIN CHUNK", "ARJUN IS STUDENT" is coded as "DIN SHUNK DINK", "SCHOOLS ARE GOOD" is coded as "JUMP MINK SINK", "TEACHER IS TEACHING" is coded as "DINK MUP CHIMP", What is the code for the word "ARJUN"?
a. CHUNK
b. DIN
c. DINK
d. SHUNK

Answer: (d)

Solution:
STUDENT ATTENDS CLASS $\rightarrow$ CHIP DIN CHUNK
ARJUN IS STUDENT $\rightarrow$ DIN SHUNK DINK $\qquad$
SCHOOLS ARE GOOD $\rightarrow$ JUMP MINK SINK $\qquad$
TEACHER IS TEACHING $\rightarrow$ DINK MUP CHIMP .(4)

IS $\rightarrow$ DINK $\quad($ From (2) \& (4))
STUDENT $\rightarrow$ DIN (From (1) \& (2))
So, ARJUN $\rightarrow$ SHUNK

Question 21. Among the given group of 4 images, which set of images can be classified as a group?

a. $(1,2,3)$
b. $(1,2,4)$
c. $(1,3,4)$
d. $(2,3,4)$

Answer: (b)

Solution:


In 1,2 and 4 all the lines are arranged in a single image as clockwise or anticlockwise only. In 3, it has a mixture of anticlockwise and clockwise directing lines.

Question 22. In which of the four images on the right can the pattern given on the left be seen as a part of the image?

a. 1
b. 2
c. 3
d. 4

Answer: (a)

Solution:


Question 23. Select one of the following four options that will make the second pair analogous to the first pair given as:
Bull : Cow :: Stallion : ?
a. Zebra
b. Mare
c. Pony
d. Stag

Answer: (b)

Solution:
$1^{\text {st }}$ is male of $2^{\text {nd }}$ one.
The $2^{\text {nd }}$ one is female. The female of Stallion is a Mare.
(Stallion refers to a horse)

Question 24.Which of the following figures will complete the series given below?



d.


Answer: (a)

Solution:


Lines are added in the anticlockwise direction to first complete the pentagons and then repeat itself again.

Question 25. Among the given group of 4 images, which set of images can be classified as a group?

a. $(1,2,3)$
b. $(1,2,4)$
c. $(1,3,4)$
d. $(2,3,4)$

Answer: (c)

Solution:

$1,3,4$ are arrows with a single arrowhead, however, ' 2 ' has double-sided arrowheads.
So, $(1,3,4)$ make a group.

Question 26. There is a relation between the first number and the symbol written adjacent to it. The corresponding symbol for the number 7 is

3\#, 6^, 2@, 7....
a. \&
b. *
c. \$
d. (

Answer: (a)

Solution:

On a keyboard, \#, $\mathbf{3}$ on the same button, $\mathbf{6 , \wedge}$ on the same button and $\mathbf{2 , @}$ on the same button also $\mathbf{7 , \&}$ on the same button.

Question 27. Three of the given four numbers are squares of prime numbers. Choose the odd one out among the following.

$$
\text { 529, 121, 169, } 441
$$

a. 529
b. 121
c. 169
d. 441

Answer: (d)

Solution:


21 is not a prime number but 23,11 and 13 are prime numbers.

So, 21 is the odd one out of the group of prime numbers.
Therefore, 441 is the odd one out.

Question 28. In a certain code language "AT A FROG'S LEAP" is coded as "JA KI MO PE", "TAKE A LEAP AHEAD" is coded as "MO LA KI SO" and "INSECTS ARE FROG'S DIET" is coded as "RE BO JA NA". What is the code for "AT" in that language?
a. A
b. $P E$
c. BO
d. RE

Answer: (b)

Solution:

AT A FROG'S LEAP $\rightarrow$ JA KI MO PE
TAKE A LEAP AHEAD $\rightarrow$ MO LA KI SO
INSECTS ARE FROG'S DIET $\rightarrow$ RE BO JA NA .....(3)
AT $\rightarrow$ ?
$\mathrm{A} \rightarrow \mathrm{MO}$ or $\mathrm{KI} \quad[$ from eq. (1) \& (2)]
$\operatorname{LEAP} \rightarrow \mathrm{KI}$ or $\mathrm{MO} \quad[$ from eq. (1) \& (2)]
FROG'S $\rightarrow$ JA
[from eq. (1) \& (3)]
So, AT $\rightarrow$ PE
[only this is left]

Question 29. In three of the options the 2nd number is related to the 1st number in a similar logical way. Which is the odd one out?
a. 99-9801
b. 91-8281
c. 81-6561
d. 69-4231

Answer: (d)

Solution:
$99^{2} \rightarrow 9801$ (perfect square)
$91^{2} \rightarrow 8281$ (perfect square)
$81^{2} \rightarrow 6561$ (perfect square)
$69^{2}=4761 \neq 4231$ (not perfect square)

Question 30. What is the word hidden in the figure?

a. QWERTY
b. ANTELOPE
c. ANTEATER
d. AUNTIE

Answer: (b)

## Solution:



Question 31. How many even number(s) in the following sequence of numbers are immediately followed by an odd number and immediately preceded by an even number?

86768932753422355228119
a. 1
b. 3
C. 5
d. 4

Answer: (d)

Solution:

867689327534223552281 19: Total of 4 such instances.

Question 32. Which of the following figures will complete the figural series given below?

a.

b.

C.

d.


Answer: (a)

Solution:


Number of removed lines: $1 \longrightarrow 1+1=2 \longrightarrow 2+2=4 \longrightarrow 4+3=7 \longrightarrow 7+4=11$

Question 33. The given options show four time instances. In which of these cases, the hour hand and minute hand will be closest to each other when this time is seen on a clock?
a. 4:00
b. 10:00
c. 6:30
d. 2:15

Answer: (c)

Solution:


Also, to be sure between 6:30 and $2: 15$, we can see that:
In 1 hour, the hour hand moves 30 .
At 6:30, 30 minutes passed after 6 . So, the hour hand has travelled 150 from 6 when the minute hand is at 6 .

At $2: 15,15$ minutes or $(2 \times 30+7.50=67.50)$ has been covered by the hour hand. Minute hand has covered 90 . Dlfference between them is $22.5^{\circ}$.

From the given representation of time instances, it can be concluded that option (c) is correct.

Question 34. How many numbers are there between 1 to 100, which are not only divisible by 4 , but also have 4 as a unit digit?
a. 5
b. 10
c. 20
d. 21

Answer: (a)

Solution:

The numbers less than 100 divisible by 4 as well as having units digit as 4 are: $(4,24,44,64,84)$. Hence, there are 5 such numbers.

Question 35. If in a certain code language 134 means GOOD AND TESTY, 478 means SEE GOOD PICTURES, 729 means PICTURES ARE FAINT, then which of the following means "SEE"?
a. 8
b. 2
c. 9
d. 1

Answer: (a)

Solution:
$134 \rightarrow$ GOOD AND TESTY
$478 \rightarrow$ SEE GOOD PICTURES
$729 \rightarrow$ PICTURES AND FAINT

SEE $\rightarrow$ ?
GOOD $\rightarrow 4$ (From (1) \& (2))
PICTURES $\rightarrow 7$ (From (2) \& (3))
So, 8 is only remaining in equation (2)
Hence, SEE $\rightarrow 8$

Question 36. Select one of the following four options that will make the second pair analogous to the first pair given as:

258: 6 : : 155 : ?
a. 5
b. 7
c. 9
d. 11

Answer: (a)

Solution:
$6^{3}+6^{2}+6=258$
$5^{3}+5^{2}+5=155$
$258 \rightarrow 6^{3}+6^{2}+6 \Rightarrow 258: 6$
$155 \rightarrow 5^{3}+5^{2}+5 \Rightarrow 155: 5$

Question 37. Among the given group of 4 images, which set of images can be classified as a group?

a. $(1,2,3)$
b. $(1,2,4)$
c. $(1,3,4)$
d. $(2,3,4)$

Answer: (b)

Solution:


So clearly ' 3 ' is the odd one because $1,2,4$ have a complete cycle of arrows either clockwise or anticlockwise.
Hence (1, 2, 4) make a group.
Question 38. Which of the answer images has the question image embedded and hidden inside?
QUESTION IMAGE


C

a. A
b. B
c. C
d. D

Answer: (c)

Solution:


It can be clearly seen from the highlighted portion that the given question image is hidden in (C).

Question 39. An analogue wrist watch is displaying the time as 3:00. If the hour hand points towards north-east direction, then in which direction is the minute hand pointing?
a. South-west
b. North-west
c. South-east
d. North-east

Answer: (b)

Solution:


The directions have been rotated 450 clockwise. Hence, the minute hand points towards the North-West.

Question 40. Suman runs a distance of 12 km from point A to point B . She then turns right and runs $\mathbf{8} \mathbf{k m}$ to reach point C . From point C , she again turns right and runs 6 km to reach point D. How far is she away from the starting point?
a. 10 km
b. 12 km
c. 13 km
d. 14 km

Answer: (a)

Solution:
Path taken by Suman as shown in the figure is:


So, $\mathrm{AE}=\mathrm{AB}-\mathrm{CD}=6 \mathrm{~km}$
$E D=B C=8 \mathrm{~km}$
$(A D)^{2}=(E D)^{2}+(A E)^{2} \quad($ By Pythagoras theorem $)$
$(A D)^{2}=(8)^{2}+(6)^{2}$
$\Rightarrow A D=10 \mathrm{~km}$

Question 41. Select one of the following four options that will make the second pair analogous to the first pair given as:

DFH : 163664 :: BDF : ?
a. 151667
b. 41636
c. 81838
d. 182190

Answer: (b)

Solution:

## 4

H
64
Hence, BDF:41636

Question 42. A man walked 8 km to the south, then he turns to his right and walks 13 km , next he moves 11 km to his right. Finally he turns to the right and moves $\mathbf{2 3} \mathbf{~ k m}$. Which direction is he now from his initial point?
a. East
b. North
c. South West
d. North East

Answer: (d)

Solution:
The man walks along the path named $P, Q, R, X, Y$.


So, the final direction is North-East from his starting point.

Question 43. In the following sequence of numbers, how many consecutive even numbers have a difference of 2 ?

## 488421614446684628461

a. 8
b. 7
c. 6
d. 5

Answer: (d)

Solution:

488421614446684628461 are 5 instances where the asked rule is followed.

Question 44. In the following series, how many pairs of successive numbers have a difference of 2 each?

641228742153862171413286
a. 4
b. 5
c. 6
d. 7

Answer: (c)

Solution:

641228742153862171413286 are 6 instances where the asked rule is followed.

Question 45. How many 4s in the following series are immediately preceded by 4 and immediately followed by 5 ?
5444554445454445445
a. 5
b. 3
c. 7
d. 4

Answer: (d)

Solution:

5444554445454445445 are 4 instances where the asked rule is followed.

Question 46. 3 numbers of the following 4 numbers are composite numbers and so form a group. Which is the one that does not belong to the group?
a. 29
b. 85
c. 147
d. 125

Answer: (a)

Solution:
$85=5 \times 17$
$147=3 \times 7 \times 7$
$125=5 \times 5 \times 5$
These three are composite numbers as they have more than two factors and 29 is a prime number.

Question 47. Select one of the following four options that will make the second pair analogous to the first pair given as:
6:345 : : 8 : ?
a. 346
b. 458
c. 640
d. 731

Answer: (d)

Solution:
$6:(6+1)^{3}+2=345:: 8:(8+1)^{3}+2=731$

Question 48. In three of the options, the 2 nd number is related to the 1st number in a similar logical way. Which is the odd one out?
a. $263: 11$
b. $331: 7$
c. $383: 13$
d. 551 : 11

Answer: (c)

Solution:
a. $2+6+3=11$
b. $3+3+1=7$
c. $5+5+1=1$
d. $3+8+3 \neq 13$

Question 49. Which is the third number to the left of the middle number in the sequence?

12345678908287376325669345186
a. 3
b. 2
c. 4
d. 5

Answer: (b)

Solution:

$$
12345678908 \underset{\substack{\downarrow 873 \\ \text { Middle }}}{\text { Min }} 76325669345186
$$

Question 50. What will be the next term of the series 10, 34, 78, 148, $\qquad$ ?
a. 238
b. 240
c. 242
d. 250

Answer: (d)

Solution:


Question 51. Select one of the following four options that will make second pair analogous to the first pair given as:

CACTUS : AU :: LOTUS :
a. EO
b. AE
c. OU
d. IU

Answer: (c)

Solution:

## CACTUS : AU :: LOTUS : OU <br> 

Question 52. In which of the four images on the right can the pattern given on the left be seen as a part of the image?

a. 1
b. 2
c. 3
d. 4

Answer: (b)

Solution:

The top part of the image (B) has the left image as its part.


Question 53. A boy walks 5 km toward south, then turns right and walks 3 km . Then he turns left and walks 5 km . In which direction is he from the starting point?
a. West
b. South
c. North-East
d. South-West

Answer: (d)

Solution:


Question 54. Select one of the following four options that will make the second pair analogous to the first pair given as:

Rectangle : 2 :: Pentagon : $\qquad$
a. 4
b. 5
c. 7
d. 10

Answer: (b)

Solution:

No. of diagonals in a rectangle $=2$


No. of diagonals in a pentagon $=5$


Question 55. Among the given group of 4 images, which set of images can be classified as a group?

a. $(1,2,3)$
b. $(1,2,4)$
c. $(1,3,4)$
d. $(2,3,4)$

Answer: (a)

Solution:

The first number is the cube of the second in all options except 4.
In 4, the order is reversed.
So, 1, 2 and 3 will make a group.

Question 56. In the following series of numbers, how many times 1, 3 and 7 have appeared together, 7 being between 1 and 3 . 297317377331738571377173906
a. 3
b. 4
c. 5
d. More than 5

Answer: (a)

Solution:

7 has appeared three times between 1 and 3 as highlighted.


Question 57. A boy walked 931 m to the north, then he turns to his left and walks 31 m . After that, he moves 931 m to his left and finally he turns to the right and moves $\mathbf{2 3} \mathbf{~ m}$. How far is he from the starting point?
a. 31 m
b. 54 m
c. 93 m
d. 99 m

Answer: (b)

Solution:
The boy walks along the path $P, Q, R, S, T$


So, $\mathrm{PT}=23 \mathrm{~m}+31 \mathrm{~m}=54 \mathrm{~m}$

Question 58. Among the given group of 4 images, which set of images can be classified as a group?

a. $(1,2,3)$
b. $(1,2,4)$
c. $(1,3,4)$
d. $(2,3,4)$

Answer: (b)

Solution:

The arrow cuts on 3 points in 1, 2, 4, however, the arrow cuts on only at one point in 3. So, 1, 2, 4 make a group.

Question 59. How many numbers in the following series are perfect cubes?

$$
1,2,3,4,5,6,7,8,7,6,5,4,3,2,1,2,3,4,5,6,7,8
$$

a. 1
b. 2
c. 3
d. 4

Answer: (d)

Solution:
$\underline{1}, 2,3,4,5,6,7, \underline{8}, 7,6,5,4,3,2, \underline{1}, 2,3,4,5,6,7, \underline{8}$
$1^{3}=1$
$2^{3}=8$
So, number of perfect cubes $=4$ (as highlighted)

Question 60. Select one of the following four options that will make the second pair analogous to the first pair given as:

JLHNF : PRNTL :: XZVBT : ?
a. RJXDF
b. DFBHZ
c. DFJPX
d. RTVXZ

Answer: (b)

Solution:


Question 61. If the word DIAMOND is coded as VQYMKLV, then the word FEMALE can be coded as
a. TUMYNU
b. UVNZOV
c. TUMZOU
d. TVNYNV

Answer: (a)

Solution:

| A | B | C | D | E | F | G | H | I | J | K | L | M |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Z | Y | X | W | V | U | T | S | R | Q | P | O | N |


| N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| M | L | K | J | I | H | G | F | E | D | C | B | A |

Position from starting
$\begin{array}{lllllll}4 & 9 & 1 & 13 & 15 & 15 & 4\end{array}$
DI A M O N D : W R $\quad$ I $\quad \mathrm{N} \quad \mathrm{L} \quad \mathrm{M} \quad \mathrm{W}$ $\begin{array}{lllllllll}\text { Position from end } & 4 & 9 & 1 & 13 & 15 & 15 & 4\end{array}$


Position from starting
$\begin{array}{llllll}6 & 5 & 13 & 1 & 12 & 5\end{array}$

| F | E | M | A | L | E | $:$ | U | V | N | Z | O | V |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  |  |  | Position from end | 6 | 5 | 13 | 1 | 12 | 5 |  |  |  |



Question 62. A list of meaningful words are given in the options. In which case, word formed has at least a pair of consecutive alphabets?
a. STARE
b. SWING
c. PRANK
d. PLAYS

Answer: (a)

Solution:
As can be seen from the given options, S and T are the only consecutive pair alphabets among all the options for the word STARE.

STARE


Question 63. Some words are given in the options. In which case, the word formed has no pair of consecutive alphabets?
a. COUNT
b. CRUST
c. PAINS
d. LIGHT

Answer: (c)

Solution:

| 3 | 15 | 21 | 14 | 20 |
| :---: | :---: | :---: | :---: | :---: |
| C | $\mathbf{O}$ | U | $\mathbf{N}$ | T |


| 3 | 18 | 21 | 19 | 20 |
| :---: | :---: | :---: | :---: | :---: |
| $\mathbf{C}$ | $\mathbf{R}$ | $\mathbf{U}$ | $\mathbf{S}$ | $\mathbf{T}$ |


| 16 | 1 | 9 | 14 | 19 |
| :--- | :--- | :--- | :--- | :--- |
| P | A | I | N | S |


| 12 | 9 | 7 | 8 | 20 |
| :---: | :---: | :---: | :---: | :---: |
| L | $\mathbf{I}$ | $\mathbf{G}$ | $\mathbf{H}$ | T |

The consecutive alphabets are highlighted.
In PAINS there is no pair of consecutive alphabets.

Question 64. In a certain code language, the word POPULAR is coded as OMMQGUK. In the same way, the word NEOMAN should be coded as
a. HVWLMC
b. ODNLZM
c. MCLIVH
d. MDMLUM

Answer: (c)

Solution:

$$
\begin{aligned}
& \text { D M M Q G U K } \\
& \text { M C L I V H }
\end{aligned}
$$

Question 65. If in a certain code language if TOUR is coded as 1357, CLEAR is coded 5678 and SPARE as 90847, then how will the word SCULPTURE be coded?
a. 953601347
b. 567903417
c. 953016347
d. 953603741

Answer: BONUS

Solution:
(Wrong question)

Question 66. In the following sequence of numbers, how many consecutive even numbers have a difference of 2 ?

444864486422144228281
a. 9
b. 8
c. 7
d. 6

Answer: (d)

Solution:


Question 67. Choose the odd one out based on the position of alphabets. GILP, ACFJ, LNQU, PRUZ
a. GILP
b. ACFJ
c. LNQU
d. PRUZ

Answer: (d)

Solution:


Question 68. In which of the four images on the right can the pattern given on the left be seen as a part of the image?

a. 1
b. 2
c. 3
d. 4

Answer: (d)

Solution:


Question 69. Which of the following figures will complete the figural series given below?

C.


Answer: (c)

Solution:


Question 70. What is the missing term in the sequence given below?

$$
\text { 29791, 24389, 19683, ?, } 12167
$$

a. 13824
b. 15625
c. 17576
d. 17926

Answer: (b)

Solution:
$29791 \quad 24389 \quad 196831562512167$

$(31)^{3} \quad(29)^{3} \quad(27)^{3} \quad(25)^{3} \quad(23)^{3}$


Question 71. What is the next number of the series given below?

$$
2,6,24,120,720, ?
$$

a. 4420
b. 4680
c. 5040
d. 5640

Answer: (c)

Solution:


Question 72. Among the given group of 4 images, which set of images can be classified as a group?

a. $(1,2,3)$
b. $(1,2,4)$
c. $(1,3,4)$
d. $(2,3,4)$

Answer: (d)

Solution:

Sum of each row, column and diagonal is 15 in 2,3 and 4 . The sums in rows and columns are not constant in 1 .

Question 73. In a certain code three statements are written in the following way
(a) "you are good" is coded as "pit dar na"
(b) "good and bad" is coded as "dar tok pa"
(c) "they are bad" is coded as "tim na tok"

To find the particular code of the word "they" which of the following statements can be dispensed with?
a. Only a
b. b and c
c. a and b and c
d. None of the statements

Answer: (d)

Solution:
you are good $\rightarrow$ pit dar na
good and bad $\rightarrow$ dar tok pa
they are bad $\rightarrow$ tim na tok

$$
\begin{array}{ll}
\text { are } \rightarrow \text { na } & \text { \{from eq.(1) and (3)\}} \\
\text { bad } \rightarrow \text { tok } & \{\text { from eq.(2) and (3)\}}
\end{array}
$$

So, they $\rightarrow$ tim
So, none of the statements can be dispensed with to obtain the code for "they". All three statements are necessary.

Question 74. Find the option that is not similar to the elements in the given set: (Angle between diagonals of a rhombus, each angle of a rectangle, each angle of a square)
a. Angle in a semicircle
b. Half of sum of opposite angles of a cyclic quadrilateral
c. Each angle of an equilateral triangle
d. Angle opposite to hypotenuse in a right angled triangle

Answer: (c)

Solution:

Angle in a semicircle subtended by its diameter is a right angle.
Sum of opposite angles of a cyclic quadrilateral is $180^{\circ}$, and its half is $90^{\circ}$.
Each angle of an equilateral triangle is $60^{\circ}$.
Angle opposite to the hypotenuse in a right-angled triangle is 90 .
Hence, option (c) is not similar to the given set.

Question 75. Given below is a figure on the left with a pattern. In which of the four images on the right can this pattern be found as a part of that image?

a. 1
b. 2
c. 3
d. 4

Answer: (b)

Solution:


2
Question 76. Given options shows four time instances. In which of these cases, the hour hand and minute hand will be closest to each other when this time is seen on a clock?
a. 7:00
b. 2:30
c. 9:30
d. Both 2:30 and 9:30

Answer: (d)

Solution:

The hands will be closest to each other means the angle between them will be the smallest among the given options.
Both in 2:30 and 9:30 O'clock the angle between the hands will be

$$
\begin{aligned}
& \left|2 \times 30-\frac{11}{2} \times 30\right|=|60-165|=105^{\circ} \\
& \left|9 \times 30-\frac{11}{2} \times 30\right|=|270-165|=105^{\circ}
\end{aligned}
$$

Question 77. Select one of the following four options that will make the second pair analogous to the first pair given as
BIOLOGY : ZHPMPJC :: CHEMISTRY
a. ZSUJTFN|D
b. ZUSJTNDIF
c. ZSUTJNFID
d. ZUSTNFJID

Answer: (c)

Solution:


Question 78. Using the letters in the words VAIN, CAR and POROUS, a word can be formed that mean the group of animals that eat other animals. What it would be?
a. HERBIVOROUS
b. OMNIVOROUS
c. CARNIVOROUS
d. AUTOTROPHS

Answer: (c)

Solution:

The word CARNIVOROUS has all the given letters in the words: VAIN, CAR and POROUS, which also means the group of animals who eat other animals.

Question 79. In a certain code language "ACTIVATE" is coded as "BCUIWAUE" How is "CATALYST" coded in that language
a. ADYMYUAT
b. ADMYUATT
c. DAUAMYTT
d. DUAAMYTT

Answer: (c)

Solution:


Question 80. In three of the options, the $\mathbf{2}^{\text {nd }}$ number is related to the $\mathbf{1}^{\text {st }}$ number in a similar logical way. Which is the odd one out?
a. 72-14
b. 1480-32
c. 288-128
d. 8640-0

Answer: (b)

Solution:

$$
7 \times 2=14
$$

$$
1 \times 4 \times 8 \times 0=0 \neq 32
$$

$$
2 \times 8 \times 8=128
$$

$8 \times 6 \times 4 \times 0=0$
Hence, option (b) is clearly the odd one out.

Question 81. Among the first 100 terms of this series, how many will be odd : $6,23,74,227,1140, \ldots \ldots \ldots .$. ?
a. 0
b. 25
c. 50
d. 100

Answer: (c)

Solution:


Here, the series formed is multiplied and then added to an odd number. Since, we know that
Even $\times$ odd + odd = Odd
And
Odd x odd + odd $=$ Even
Therefore, starting from 6, every alternate term is even and all the other alternate numbers are odd. There will be an equal number of odd and even numbers. Hence, the number of odd numbers will be 50 .

Question 82. Which of the following figures will complete the figural series given below?

a.

b.



Answer: (a)

Solution:

(1) $\rightarrow$ Remove
(2) $\rightarrow$ (1)
(3) $\rightarrow$ (2)
(4) $\rightarrow$ (3)
(5) $\rightarrow$ (4) with flip vertically
(5) $\rightarrow$ New symbol


Question 83. A list of meaningful words are given in the options. In which case, the word formed has at least a pair of consecutive alphabets?
a. CLEAR
b. FORCE
c. CRANE
d. BLUSH

Answer: (b)

Solution:

Here, the word formed which has at least a pair of consecutive alphabets is 'FORCE'. It has 'E' and 'F' which are consecutive letters.

Question 84. The given options show four time instances. In which of these cases, the hour hand and minute hand will be farthest from each other when this time is seen on a clock?
a. 6:00
b. $2: 30$
c. $4: 30$
d. 7:30

Answer: (a)

Solution:

In the case of 6:00 $0^{\prime}$ clock, the angle between the hands is $180^{\circ}$. Hands the hour hand and minute hand will be farthest from each other.

Question 85. Which of the following geometric figures CANNOT be found in given image?

a. Parallelogram
b. Rectangle
c. Circle
d. Triangle

Answer: (c)

Solution:


Only the circle is not present in the given figure.

Question 86. Which number replaces the question mark in the given series? $1, \frac{2}{5}, \frac{4}{25}, \frac{8}{125}$, ?
a. $\frac{606}{5}$
b. $\frac{10058}{3}$
c. $\frac{3}{5}$
d. $\frac{16}{625}$

Answer: (d)

Solution:


Question 87. Some words are given in the options. In which case, the word formed has at least a pair of consecutive alphabets?
a. NIGHT
b. PAINS
c. CLEAR
d. SWING

Answer: (a)

Solution:

G and H are consecutive letters in the word ' NIGHT '.

Question 88. Pari kumari rode her horse northward, then she turned left and rode 1 km and again turned left and rode 2 km . She found herself 1 km west of her beginning point. How far did she ride northward initially?
a. 1 km
b. 2 km
c. 3 Km
d. 5 km

Answer: (b)

Solution:

Pari kumari rode along $P, Q, R, S$. We have to find $P Q$, because in that path she moved due North.


Here, we can see, on moving from $P$ to $Q$, the distance covered is 2 km .

Question 89. Mohan walked 84 m to the north, then he turns to his right and walks 9 m , again he moves 44 m to his right. How far is he from the starting point?
a. 41 m
b. 45 m
c. 50 m
d. 59 m

Answer: (a)

Solution:
The path taken by Mohan is along $P, Q, R, S$.


Using the Pythagoras theorem, the distance between PS is

$$
\begin{aligned}
& \mathrm{PS}=\sqrt{P T^{2}+T S^{2}} \\
& \sqrt{9^{2}+40^{2}} \\
& \sqrt{1681} \\
& =41 \mathrm{~m}
\end{aligned}
$$

Question 90. Choose the odd one out based on the position alphabets. BDGWY, ACFXZ, FHJSU, GILRT
a. BDGWY
b. ACFXZ
c. FHJSU
d. GILRT

Answer: (c)

Solution:

The odd one out based on the positions of alphabets is FHJSU. We can see that the difference between 1st and 2 nd letter and 2 nd and 3 rd letter is 2 and 3 respectively in all options except (c).

| 2 | 4 | 7 | 23 | 25 |
| :---: | :---: | :---: | :---: | :---: |
| B | D | G | W | Y |
|  |  |  |  |  |
| 1 | 3 | 6 | 24 | 26 |
| A | C | F | X | Z |
|  |  |  |  |  |
| 6 | 8 | 10 | 19 | 21 |
| F | H | J | S | U |
|  |  |  |  |  |
| 7 | 9 | 12 | 18 | 20 |
| G | I | L | $R$ | T |

Question 91. Which of the following figures will complete the figural series given below?

a.

b.

c.

d.


Answer: (c)

Solution:

anti-clockwise anti-clockwise anti-clockwise anti-clockwise anti-clockwise

move 2-steps anti-clockwise


Question 92. Three out of the four are perfect squares. Which is the odd one out? 6241, 7569, 4993, 8649
a. 6241
b. 7569
c. 4993
d. 8649

Answer: (c)

Solution:
$6241 \rightarrow 79^{2}$
$7569 \rightarrow 87^{2}$
$4993 \rightarrow$ Not perfect square.
$8649 \rightarrow 93^{2}$
So, 4993 is the odd one.

Question 93. How many $6 s$ in 888862686622888866888 are immediately preceded by 2 but NOT immediately followed by 8 ?
a. 3
b. 0
c. 4
d. 2

Answer: (b)

Solution:

In the given series, there are no such 6's which satisfy the conditions given in the question. Hence, the correct answer is zero.

## Question 94. Choose the odd one out based on the position alphabets ABYZ, DFUW, FIRV, MEVN

a. ABYZ
b. DFUW
c. FIRV
d. MEVN

Answer: (c)

Solution:

| 1 | 2 | 25 | 26 |
| :---: | :---: | :---: | :---: |
| A | B | Y | $Z$ |


| 4 | 6 | 21 | 23 |
| :---: | :---: | :---: | :---: |
| $D$ | F | U | W |


| 6 | 9 | 18 | 22 |
| :--- | :--- | :--- | :--- |

F I R V
$13 \quad 5 \quad 22 \quad 14$
$M$ E V N
The sum of positions of first and last letter and second and second last letter is constant for options a, b, d. The sum is 27 . However, that is not true for option (c).

Question 95. A girl moves a distance of 189 m towards west. Then she turned to the right and walks for about 91 m . She turned left and moves 123 m . Finally she
turned to the left at an angle of $45^{\circ}$ and started moving. In which direction was she moving finally?
a. North
b. North East
c. East
d. South West

Answer: (d)

Solution:

The girl travelled along the path $P, Q, R, O, A$


The girl was finally moving towards the South-West direction.

Question 96. Which of the following figures will complete the figural series given below?


a.

d.

Answer: (b)

Solution:
(1)
(2)


Rotation by $45^{\circ}$ anti-clock wise.
and flipped (only 1)

There is a 450 rotation every time in the anticlockwise direction and each time starting from the structure with a circle, the circle and arrow are flipped alternately.

Question 97. Which of the following figures will complete the figural series given below?

a.

b.

c.

d.

Answer: (d)

Solution:


Question 98. Which of the following figures will complete the figural series given below?


a.

d.


Answer: (b)

Solution:
Let the sides of each triangle be denoted by $l$.


Question 99. What will be the next term of the series

$$
8,12,24,60, \ldots ?
$$

a. 90
b. 120
c. 160
d. 180

Answer: (d)

Solution:


Question 100. Which of the following figures will complete the figural series given below?

b.

c.


Answer: (a)

Solution:

The pattern of circle filling goes anti-clockwise. The first circle that is filled is at the top left corner.


# NATIONAL TALENT SEARCH EXAMINATION 

(NTSE 2021) STAGE - 1

STATE : Odisha
PAPER : SAT
Date : 15/01/2021
Max. Marks : 100 SOLUTIONS Time : 120 mins.

Question 01. Match the major types of vegetation in List -I with their important trees in List - II.

| List - I | List - II |
| :--- | :--- |
| (p) Mangrove Forests | (i) Teak |
| (q) Montane Forests | (ii) Babool <br> (Acacia) |
| (r) Tropical Thorn <br> Forests | (iii) Pine |
| (s) Tropical Deciduous <br> Forests | (iv) Sundari |

a. (p)-(i), (q)-(iii), (r)-(iv), (s)-(ii)
b. (p)-(ii), (q)-(iii), (r)-(iv), (s)-(i)
c. (p)-(iv), (q)-(iii), (r)-(ii), (s)-(i)
d. (p)-(iii), (q)-(ii), (r)-(iv), (s)-(i)

## Answer: (c)

Solution:
Sundari trees are found in Mangrove forests after which Sunderbans in West Bengal have been named. Pine trees can be found in the Montane Forests. Babool (Acacia) is a thorny tree found in Tropical Thorny Forests. Teak can be found in Tropical Deciduous forests along with other trees like Sal, Shisham, Mahua etc.

Question 02. The experimental projects for generating which type of energy can be found in Puga valley in Ladakh and Manikaran in Himachal Pradesh?
a. Solar energy
b. Wind energy
c. Atomic energy
d. Geothermal energy

Answer: (d)
Solution:
Puga valley lies in the south-eastern part of Ladakh and forms a part of the Himalayan geothermal belt. This zone shows geothermal activity in the form of hot springs and mud pools. Experimental projects for generating geothermal energy can be found in this region. Besides, areas like Chhumathang in Jammu and Kashmir, Manikaran in Himachal Pradesh, Tattapani in Chhattisgarh, UnhavreKhed in Maharashtra and Tapoban in Uttarakhand are also potential sites for geothermal energy.

## Question 03. Which mine is found in Khetri, situated at the foothills of the Aravalli Range, Rajasthan?

a. Bauxite
b. Lignite
c. Coal
d. Copper

Answer: (d)
Solution:
Khetri in Rajasthan is famous for its copper mines. Situated at the foothills of the Aravali, It is a part of the North Delhi fold Belt. Prominent deposits of the belt include Khetri ,Kolihan, Banwas, Chandmari, Dhani Basri, and Baniwali Ki Dhani.

Question 04. Match the rivers in List -I with the state of their origin in List-II

| List - I | List - II |
| :--- | :--- |
| (p) Mahanandi | (i) Uttarakhand |
| (q) Godavari | (ii) Chhattishgarh |
| (r) Kaveri | (iii) Maharashtra |
| (s) Ganga | (iv) Karnataka |

a. (p)-(ii), (q)-(iii), (r)-(iv), (s)-(i)
b. (p)-(iii), (q)-(ii), (r)-(iv), (s)-(i)
c. (p)-(i), (q)-(iii), (r)-(iv), (s)-(ii)
d. (p)-(iv), (q)-(i), (r)-(ii), (s)-(iii)

Answer: (a)
Solution:
Mahanadi originates in the hills of Chhattisgarh.
The Godavari River rises from Western Ghats in northwestern Maharashtra.
Kaveri rises on Brahmagiri Hill of the Western Ghats in southwestern Karnataka.
The river Ganges rises in the mountainous region of northern Uttarakhand.
Question 05 . Which of the following types of soils have mostly come into existence due to weathering of ancient crystalline and metamorphic rocks?
a. Regur and Black soils
b. Red and yellow soils
c. Arid and Semi-arid soils
d. Peaty and Marshy soils

Answer: (b)
Solution:
Red soil develops on crystalline igneous rocks with low rainfall. The soil becomes reddish due to a wide diffusion of iron in crystalline and metamorphic rocks and
turns yellow when its in hydrated form. The eastern and southern part of the Deccan Plateau has such yellow and red soils.

## Question 06. What is the full form of ITCZ?

a. Indian Tropical Convergence Zone
b. Inter Tropical Climate Zone
c. Inter Tropical Convergence Zone
d. Inter Temperate Convergence Zone

Answer: (c)
Solution:
The Inter Tropical Convergence Zone or ITCZ is a belt of low pressure which circles the Earth generally near the equator where the trade winds of the Northern and Southern Hemispheres converge and ascend. ITCZ is also known as doldrums.

## Question 07. Chambal is a tributary of which of the following rivers?

a. The Naramata
b. The Yamuna
c. The Godavari
d. The Tapti

Answer: (b)
Solution:
Chambal is a tributary of the river Yamuna. It rises in the Vindhya Range in western Madhya Pradesh state. From its source, it flows north into Rajasthan and along the Rajasthan-Madhya Pradesh border. It touches a portion of the Uttar Pradesh-Madhya Pradesh border and flows through Uttar Pradesh to empty into the Yamuna.

Question 08. The cultivation of which plantation crop was initially introduced on the Baba Budan hills In Karnataka?
a. Coffee
b. Tea
c. Rubber
d. Sugarcane

Answer: (a)

Solution:
Coffee was introduced in the Baba Budan hills in Karnataka during the 17th century. Baba Budan brought coffee seeds from Yemen and planted them on the slopes of the Chandragiri Hills. Later, this area came to be known as Baba Budan hills.

Question 09. Which of the following islands is the largest inhabited riverine island located in the Himalayan river system of India?
a. Majuli island
b. Teressa island
c. Hope island
d. Umananda island

Answer: (a)

Solution:
Majuli Island is the largest inhabited Riverine Island located in the Himalayan River system of India. It is situated on the river Brahmaputra near Jorhat district of Assam.

Question 10. What is the criteria to consider a person as a literate according to census of India 2001?
a. 6 years old and above, and can read and write with understanding in any language
b. 7 years old and above, and can read and write with understanding in any language
c. 5 years old and above, and can read and write with understanding in any language
d. 9 years old and above, and can read and write with understanding in any language

Answer: (b)
Solution:
India conducted the fourteenth decennial census in 2001. According to the census of India 2001, a person aged seven and above who can both read and write with understanding in any language, is treated as literate.

## Question 11. Which of the following is the CORRECT classification of resources on the basis of origin?

a. Biotic resources and Abiotic resources
b. Renewable and non-renewable resources
c. National resources and International resources
d. Individual resources and Community owned resources

## Answer: (a)

Solution:
Based on origin, resources can be classified into Biotic and Abiotic resources. Resources obtained from the biosphere and which have life, are called biotic resources. For example-forests, wildlife, fisheries, livestock, human beings, etc.Resources which are obtained from non-living things are called abiotic resources. Iron, copper, gold and lead are abiotic resources.

Question 12. Which of the following options is the youngest mountain range of India?
a. Himalayan mountain range
b. Aravalli mountain range
c. Vindhya mountain range
d. Satpura mountain range

Answer: (a)

Solution:
The Himalayan mountain ranges are the youngest mountain ranges of India. This rugged, fold mountain range began to form around 40-50 million years ago.
Vindhya, Aravali and Satpura mountain ranges are comparatively older than the Himalayan range.

Question 13. Who among the following leaders represented Great Britain in the Treaty of Versailles' that was signed at Paris and brought World War I to an end?
a. Georges Clemenceau
b. Woodrow Wilson
c. Vittorio Emanuele Orlando
d. David Lloyd George

Answer: (d)

## Solution:

David Lloyd George was a Welsh politician and British Prime Minister. He served at the time of World War I. He was a British representative when the Treaty of Versailles was signed at Paris in 1919. This treaty brought an end to the War.

Question 14. Identify the first satellite completely designed and fabricated in India and launched by a Soviet Kosmos3M rocket in 1975.
a. Rohini
b. Bhaskara-I
c. INSAT-1A
d. Aryabhatta

Answer: (d)

Solution:
Aryabhatta was India's first satellite. It was completely designed and fabricated by the Indian Space Research Organisation (ISRO). It was launched in 1975, by a Soviet Kosmos3M rocket.

Question 15. Which eminent personality from Odisha was appointed as a member of the Royal Agricultural Commission in 1927?
a. Karmaveer Gourishankar Ray
b. Kashinath Das
c. Maharaja Krushna Chandra
d. Sashi Bhusan Rath

Answer: (c)
Solution:
Maharaja Krushna Chandra was appointed as a member of the Royal Agricultural Commission in 1927. He is also considered as the architect of the modern state of Odisha.

Question 16. Which of the following options is INCORRECT with reference to the important aspects of the process of Urbanisation in India?
a. Economic aspects
b. Socio-cultural aspects
c. The demographic and spatial aspects
d. Religious aspects

Answer: (d)
Solution:
Religious aspects do not play an important role in the process of urbanisation in India. Religion is a private affair. Moreover, India is a secular country, which means that no particular religion plays a role in the development process of the country.

Question 17. Who of the following became Prime Minister of Italy in 1922 and gave rise to fascism?
a. Benito Mussolini
b. Victor Emmanuel
c. Dino Grandi
d. Marie Jose

Answer: (a)
Solution:
Benito Mussolini became the Prime Minister of Italy in 1922. He was the youngest prime minister of Italy and one of the first dictators of the twentieth century. His political rise was fascist in nature.

Question 18. Which of the following countries was formally granted independence in 1946 after being ruled by United States?
a. Philippines
b. Sri Lanka
c. Egypt
d. China

Answer: (a)

Solution:
Philippines gained independence from the United States of America on 4th July 1946. Manuel Quezon was elected as the first president of the Republic of Philippines.

Question 19. Which of the following options listed amongst UNESCO World Heritage Sites is known for its Kalinga Architecture?
a. Black Pagoda (Sun Temple), Konark
b. Mahabodhi Temple, Bodh Gaya
c. Jantar Mantar, Jaipur
d. Rani ki Vav, Patna

Answer: (a)
Solution:
Black Pagoda or Sun Temple was constructed by Narsimhadeva I. It is dedicated to the Hindu god, Surya and is famous for being an excellent portrayal of the Kalinga Architecture. It was listed as a UNESCO World Heritage Site in 1984.

Question 20. Who of the following was arrested at Chandol for having addressed a meeting during the civil disobedience movement in Odisha?
a. Harekrushna Mahatab
b. Surendranath Das
c. Gopabandhu Choudhury
d. Acharya Harihar

Answer: (c)

## Solution:

Gopabandhu Choudhury was arrested at Chandol in Odisha. It was because he addressed a meeting during the Civil Disobedience Movement. He was an Indian activist, social worker and freedom fighter and follower of Mahatma Gandhi.

Question 21. North Atlantic Treaty Organization (NATO) came into existence to provide collective security against the threat posed by which of the following power blocks?
a. West Germany
b. Imperial China
c. Arab League
d. Soviet Union

Answer: (d)

## Solution:

The North Atlantic Treaty Organisation came into existence on 4th April 1949. It is an intergovernmental military alliance which consists of European and North American nations. It was born out of the necessity to provide collective security against threats posed by the Soviet Union.

Question 22. The famous Treaty of Tordesillas' was signed between which of the following two European powers aimed at settling conflicts over lands newly discovered or explored by Christopher Columbus and other late 15th-century voyagers?
a. British and French
b. Portugal and Spain
c. Dutch and Denmark
d. Austrian and Germans

Answer: (b)
Solution: The Treaty of Tordesillas' was signed on 7th June 1494 in Tordesillas, Spain. The treaty settled a dispute between Spain and Portugal over sharing of newly discovered lands by Christopher Columbus and other explorers.

## Question 23. The rule of Qing Dynasty ended in 1911 in which of the following Asian countries?

a. Thailand
b. Vietnam
c. North Korea
d. China

Answer: (d)

## Solution:

The Qing Dynasty was one the last imperial dynasties of China. It spanned from 1634 CE to 1911 CE. The Republic of China was established, after the fall of the Qing dynasty.

Question 24. Laxman Naik who was arrested from Koraput district of Odisha is associated with which of the following movements of freedom Struggle?
a. Salt Satyagraha
b. Quit India Movement
c. Khilafat Movement
d. Non-Cooperation Movement

Answer: (b)
Solution:

Laxman Naik was arrested from the Koraput district of Odisha for his association with the Quit India Movement. He was a tribal civil rights activist and a devout Gandhian.

Question 25. Choose the alternative that correctly matches the organisms in Group 1 with their features in Group 2.

| List-I List-II |  |
| :--- | :--- |
| a. Hydra | (i) Species live in colonies |
| b. Corals | (ii) Species have a solitary-life span |
| c. Spongilla | (iii) Organism with holes |
| d. Roundworm | (iv) Species found in the intestine |

a. a-(iii), b-(i),c-(iv),d-(ii)
b. a-(i), b-(iii), c-(ii),d-(iv)
c. a-(ii), b-(i),c-(iii),d-(iv)
d. a-(iv), b-(ii), c-(iii),d-(i)

Answer: (c)

## Solution:

- Hydra is a group of small, fresh-water organisms with a solitary life span. They belong to the phylum Cnidaria.
- Corals live in compact colonies consisting of many identical, individual polyps. They belong to the phylum Cnidaria or Coelenterata.
- Spongilla is a genus of freshwater sponges of the phylum porifera. Poriferans have pores or small holes in their bodies. Hence, the name porifera (Pore: Holes).
- Roundworms belong to the phylum nematoda and are generally parasitic.

They usually live in human intestines.

Question 26. It does not have a mouth for ingestion of food. It ingests the food by encircling it and forming pseudopodia. When the food is completely encircled, it is engulfed in the form of a bag called food vacuole. The excess food absorbed is stored in the form of glycogen and lipids. The undigested food gets collected in the food vacuole and is thrown out of the body by rupturing the cell membrane. Identify the organism.
a. Chlamydomonas
b. Amoeba
c. Hydra
d. Sea anemone

Answer: (b)
Solution:

The following are the steps in digestion in Amoeba:


So, the given organism is Amoeba.

Question 27.'Gymnosperm' is a term made from two Greek words: Gymno and Sperma which means:
a. Whip-like, flagella
b. Hair-like, cilia
c. Covered, seed
d. Naked, seed

Answer: (d)

Solution:
'Gymnosperm' comes from a Greek word which means 'naked seeds' - Gymno: naked; Sperma: seed. The seeds of these plants are not enclosed within fruits, they are naked.

Question 28. The endoskeleton and exoskeleton of various animals are formed from this. This is incorporated into life forms through the basic process of photosynthesis, which is performed in the presence of sunlight by all life-forms that contain chlorophyll. This molecule's cycle process converts itself from the atmosphere or dissolved in water into glucose molecules. Name the molecule.
a. Nitrogen
b. Carbon
c. Water
d. Nitrate

Answer: (b)

Solution:

The endoskeleton and exoskeleton of animals is made up of calcium carbonate. Carbon is incorporated into life-forms through photosynthesis in the form of
glucose. Also, the carbon cycle involves conversion of carbon dioxide from the atmosphere.

Question 29. Two healthy potted plants A and B were taken and kept in a dark room for 3 days, they were placed in separate glass plates and a watch-glass containing potassium hydroxide was placed by the side of Plant A. Both the plants were covered with separate bell jars. Vaseline was used to seal the bottom of the jars and were set-up air tight. Both the plants were kept in sunlight for $\mathbf{2}$ hours. Leaves were plucked from each plant and checked for the presence of starch. Due to the non-availability of which of the following components, photosynthesis did not occur in the plant A?
a. Water
b. Carbon dioxide
c. Chlorophyll
d. Starch

Answer: (b)
Solution:
Photosynthesis did not occur in plant ' $A$ ' due to the absence of carbon dioxide. When the plants were placed in the dark room for 3 days, all the starch in the plant was used up. So, any starch in the plant after it is kept in sunlight would indicate that the plant has undergone photosynthesis. Since potassium hydroxide was placed in the jar with plant ' $A$ ', all the carbon dioxide in that particular jar was absorbed. Hence, plant ' $A$ ' could not photosynthesise.

Question 30. Diverse organisms use different ways to break-down glucose completely into carbon dioxide and water. Sometimes when there is a lack of oxygen in our muscle cells, another pathway for the break-down of pyruvate is taken. Here, the pyruvate is converted into the lactic acid which is a
a. Six-carbon molecule
b. Two-carbon molecule
c. Three-carbon molecule
d. Five-carbon molecule

Answer: (c)

Solution:

Lactic acid is a chemical by-product of anaerobic respiration in muscle cells. The formula of Lactic acid is $\mathrm{C}_{3} \mathrm{H}_{6} \mathrm{O}_{3}$. Hence, it's a 'three-carbon molecule'.

Question 31. Match the following essential components of the environment given in List-I with their meanings given in List-II.

| List-I | List-II |
| :--- | :--- |
| a. Reduce | (i) plastic bottles can be used for storing things in the <br> kitchen |
| b. Recycle | (ii) switching off unnecessary lights and fans |
| c. Reuse | (iii) segregation of wet and dry waste |
|  | (iv) buying individual plastic bottles of water every time <br> after use |

a. $a-(i i), b-(i i i), c-(i)$
b. a-(i), b-(ii),c-(iii)
c. $a-(i v), b-(i), c-(i i i)$
d. a-(iii), b-(iv), c-(i)

Answer: (a)

Solution:
a. Reduce means to minimise the amount of waste we create. Switching off unnecessary lights and fans is an example of 'reduce'.
b. Recycle means putting a product to a new use instead of throwing it away. Segregation of wet and dry wastes helps in choosing the product that can be recycled.
c. Reuse refers to using items more than once. For example, plastic bottles can be used for storing things in the kitchen.

Question 32.Niacin is an important nutrient found in the fish which is an animal product. It is a form of
a. Vitamin $B_{3}$
b. Vitamin $B_{2}$
c. Vitamin $B_{1}$
d. Vitamin $\mathrm{B}_{12}$

Answer: (a)

Solution:

Niacin, also called Vitamin $B_{3}$ is found in a variety of foods, especially meat, poultry and fish.

## Question 33.Read the following statements regarding the function of Golgi apparatus and choose the CORRECT option:

a. It plays a central role in cellular reproduction, the process by which a single cell divides and forms two new cells.
b. It contains ribosomes attached to its surface which are sites for protein manufacture.
c. It helps in storage, modification and packaging of products in the vesicles.
d. It helps to keep the cell clean by digesting any foreign material as well as worn-out cell organelles.

Answer: (c)
Solution:

Golgi apparatus: It is an organelle in eukaryotic cells that stores and modifies proteins. It also packages these proteins into vesicles for its transport to various other places.

Question 34. Which of the following gas makes up 78\% of our atmosphere and it is also a part of many molecules essential to life like proteins, nucleic acids and some vitamins?
a. Nitrogen
b. Carbon
c. Oxygen
d. Argon

Answer: (a)
Solution:

Nitrogen gas makes up 78\% of our atmosphere and it is also a part of many essential molecules to life like proteins, nucleic acids and some types of vitamins.

Question 35. They are found to be very sensitive to the levels of contaminants like sulphur dioxide in the air, they are commonly found growing on the bark of trees as a thin greenish-white crust. They are considered to be the very useful bioindicators of air pollution. Name the organism.
a. Mycorrhiza
b. Lichens
c. Amoeba
d. Euglena

Answer: (b)
Solution:

Lichens are associations of algae and fungi. They usually grow on surfaces like bark of trees, rocks, wet floors, etc. They are regarded as pollution indicators because they are sensitive to sulphur dioxide $\left(\mathrm{SO}_{2}\right)$ and do not grow in polluted areas.

Question 36.Read the following statements regarding the function of Lymph in transportation within the human body and choose the CORRECT option:.
a. It carries the blood away from the heart to various organs of the body and it ensures that the blood flows only in one direction.
b. It is divided into smaller vessels to bring blood in contact with all the individual cells.
c. It circulates around the body and helps to clot the blood during the time of injury.
d. It carries digested and absorbed fat from intestine and drains excess fluid from extracellular space back into the blood.

Answer: (d)

## Solution:

The lymph is a colourless fluid found in the body. It helps in returning all the excess fluid from the extracellular spaces to the blood. It also helps in the transport of fat from the intestines.

Question 37.Plants also require nutrients for growth and development. Which of the following nutrients are supplied to plants by air and water?
a. Nitrogen
b. Argon
c. Helium
d. Oxygen

Answer: (d)
Solution:

Plants require nutrients like carbon, hydrogen, oxygen, potassium, etc. They either get these nutrients from air or they absorb it through their roots. Nutrients like carbon and oxygen are absorbed from the atmosphere. Along with that, they also get oxygen from water which they absorb through the roots.

Question 38. Match the following scientists given in List-I with their respective discovery given in List-II

| List-I | List-II |
| :--- | :--- |
| a. Robert Hooke | (i) Discovered the free-living cells in pond water. |
| b. Antonie van Leeuwenhoek | (ii) Observed the cells in a cork slice with the <br> help of microscope. |
| c. Robert Brown | (iii) Discovered the nucleus in the cell. |
| d. J.E. Purkinje | (iv) Coined the term 'protoplasm' for the fluid <br> substance of the cell. |

a. a-(ii), b-(i),c-(iii),d-(iv)
b. a-(iii), b-(i), c-(iv),d-(ii)
c. $a-(i), b-(i i i), c-(i i), d-(i v)$
d. a-(iv), b-(ii), c-(iii),d-(i)

Answer: (a)

Solution:

- Robert Hooke observed cells from the bark of a tree.
- Anton van Leeuwenhoek was the first to discover the free-living cells in pond water.
- Robert Brown discovered nucleus in 1831. He observed it in a plant tissue.
- J.E. Purkinje coined the term protoplasm in 1839.

Question 39. If $\mathbf{a}$ and $\mathbf{b}$ are rational numbers and $\frac{3+\sqrt{5}}{3-\sqrt{5}}=a+b \sqrt{5}$ then, the values of $a$ and $b$ are
a. $a=\frac{5}{2}$ and $b=\frac{3}{2}$
b. $a=\frac{7}{2}$ and $b=\frac{3}{2}$
c. $a=\frac{1}{2}$ and $b=\frac{5}{2}$
d. $a=\frac{3}{2}$ and $b=\frac{1}{2}$

Answer: (b)

Solution:
$\frac{3+\sqrt{5}}{3-\sqrt{5}}=a+b \sqrt{5} \quad$ (given)
On rationalizing the denominator, we get
$\frac{3+\sqrt{5}}{3-\sqrt{5}} \times \frac{3+\sqrt{5}}{3+\sqrt{5}}=a+b \sqrt{5}$
$\Rightarrow \frac{(3+\sqrt{5})^{2}}{3^{2}-(\sqrt{5})^{2}}=a+b \sqrt{5}$
$\Rightarrow \frac{14+6 \sqrt{5}}{4}=a+b \sqrt{5} \quad\left(\right.$ Since $\left.(a+b)^{2}=a^{2}+2 a b+b^{2} \& a^{2}-b^{2}=(a+b)(a-b)\right)$
$\Rightarrow \frac{7}{2}+\frac{3 \sqrt{5}}{2}=a+b \sqrt{5}$
On comparing, we get
$a=\frac{7}{2}, b=\frac{3}{2}$

Question 40. A pair of linear equations in two variables can be presented by two straight lines. In case of which pair of equations do the straight lines coincide?
a. $2 x+3 y-9=0$ and $4 x+6 y-18=0$
b. $5 x-4 y+8=0$ and $7 x+6 y-9=0$
c. $2 x-y+9=0$ and $6 x-3 y+10=0$
d. $2 x-3 y=7$ and $3 x+2 y=5$

Answer: (a)

Solution:

If a pair of linear equations in two variables
$a_{1} x+b_{1} y+c_{1}=0$ and $a_{2} x+b_{2} y+c_{2}=0$, coincide, then
$\frac{a_{1}}{a_{2}}=\frac{b_{1}}{b_{2}}=\frac{c_{1}}{c_{2}}$
By options inspection, we get
a. $\frac{2}{4}=\frac{3}{6}=\frac{-9}{-18} \quad$ [Accepted]
b. $\frac{5}{7} \neq \frac{-4}{6} \neq \frac{8}{-9} \quad$ [Rejected]
c. $\frac{2}{6}=\frac{-1}{3} \neq \frac{9}{10} \quad[$ Rejected $\}$
d. $\frac{2}{3} \neq \frac{-3}{2} \neq \frac{-7}{-5} \quad$ [Rejected]

Question 41. A bag contains red, white and green balls in the ratio $3: 4$ : 5. If the bag contains $\mathbf{8 0}$ green balls, then the total number of balls in the bag is
a. 145
b. 156
c. 192
d. 187

Answer: (c)

Solution:

Let the red ball $=3 \mathrm{k}$
White balls $=4 \mathrm{k}$
And green balls $=5 \mathrm{k}$
$\Rightarrow 5 \mathrm{k}=80 \quad$ (given)
$\Rightarrow k=16$
So total number of balls in the bag $=3 k+4 k+5 k=12 k=12 \times 16=192$

Question 42. The elements of a set $X$ are $\{4,6,2,8, A, 12,15,10\}$. If the average of the elements of the set $X$ is 8 , then the median of the set $X$ is:
a. 7.5
b. 8
c. 8.5
d. 9

Answer: (a)

Solution:
$X=\{4,6,2,8, A 12,15,10\}$
Avg. of element of $X=8$ (given)
$\Rightarrow \frac{4+6+2+8+A+12+15+10}{8}=8$
$\Rightarrow 57+A=64$
Now, arranging the elements of set X in ascending order
$2,4,6,7,8,10,12,15$
Since, total no. of elements $(\mathrm{n})=8$ i.e. even
$X=\frac{T_{\frac{n}{2}}+T_{\frac{n}{2}+1}}{2}$ where, $T_{\frac{n}{2}}=\left(\frac{n}{2}\right)^{\text {th }}$ term
$=\frac{T_{4}+T_{5}}{2}=\frac{7+8}{2}=7.5$

Question 43. If a vertical pole of height 9 m casts a shadow $3 \sqrt{3} \mathrm{~m}$ long on the ground, then the angle of elevation of the sun is
a. $30^{\circ}$
b. $45^{\circ}$
c. $60^{\circ}$
d. $90^{\circ}$

Answer: (c)
Solution:

Let the angle of elevation is $\theta, P Q$ is a vertical pole and $Q R$ is its shadow.


In $\triangle \mathrm{ABC}, \tan \theta=\frac{\text { perpendicular }}{\text { base }}$
$\Rightarrow \tan \theta=\frac{9}{3 \sqrt{3}}=\sqrt{3}$

$$
\Rightarrow \theta=60^{\circ}
$$

Question 44. Which are the $\mathbf{2}$ factors that we get when the below expression is factorized?
$4(3 a-2)^{2}-3(3 a-2)(a+5)-7(a+5)^{2}$
a. $(a+3)$ and $(19 a-3)$
b. $(4 a+8)$ and $(19 a+43)$
c. $(a+3)$ and $(a-43)$
d. $(4 a+3)$ and $(5 a-43)$

Answer: (d)

Solution:
$4(3 a-2)^{2}-3(3 a-2)(a+5)-7(a+5)^{2}$
Let $(3 a-2)=x$ and $(a+5)=y$
$\Rightarrow 4 \mathrm{x}^{2}-3 \mathrm{xy}-7 \mathrm{y}^{2}$
$\Rightarrow 4 x^{2}-7 x y+4 x y-7 y^{2}$
$\Rightarrow \mathrm{x}(4 \mathrm{x}-7 \mathrm{y})+\mathrm{y}(4 \mathrm{x}-7 \mathrm{y})$
$\Rightarrow(4 x-7 y)(x+y)$
From equation (1) and (2),
$\Rightarrow[4(3 a-2)-7(a-5)][(3 a-2)+(a+5)]$
$\Rightarrow[12 a-8-7 a-35][4 a+3]$
$\Rightarrow(5 a-43)(4 a+3)$

Question 45. If the distance between the points $(-1,-2)$ and $(2, x)$ is 5 , then one of the values of $x$ is
a. 3
b. -2
c. 6
d. -6

Answer: (d)
Solution:
Distance between two points $\left(\mathrm{x}_{1}, \mathrm{y}_{1}\right)$ and $\left(\mathrm{x}_{2}, \mathrm{y}_{2}\right)$ is $=\sqrt{\left(x_{2}-x_{1}\right)^{2}+\left(y_{2}-y_{1}\right)^{2}}$
$\sqrt{[2-(-1)]^{2}+[x-(-2)]^{2}}=5$
(Distance between $(-1,-2)$ and $(2, x)=5$ given)
Squaring both sides, we get
$9+(x+2)^{2}=25$
$(x+2)^{2}=16$
$(x+2)= \pm 4$
Case-I: $x+2=4$
$\Rightarrow \mathrm{x}=2$
(a)

Case- II: $x+2=-4$
$\Rightarrow \mathrm{x}=-6$
(b)

From (a) and (b),
$x=2$ or -6

Question 46. What is the value of the expression given below?
a. $2^{-9 n}$
b. $2^{-8 n}$
c. $2^{-7 n}$
d. $3^{-7 n}$

Solution:

Provided data is incomplete in the question.

Question 47. The mean of five numbers is 30. A sixth number is added. The new mean of six numbers is found to be 31. The sixth number is:
a. 34
b. 32
c. 36
d. 30

Answer: (c)

Solution:

Let the numbers be $a_{1}, a_{2}, a_{3}, a_{4}$ and $a_{5}$.
Mean $=\frac{a_{1}+a_{2}+a_{3}+a_{4}+a_{5}}{5}$
$30=\frac{a_{1}+a_{2}+a_{3}+a_{4}+a_{5}}{5}$
(given, mean $=30$ )
$\therefore a_{1}+a_{2}+a_{3}+a_{4}+a_{5}=150$
Now, let the $6^{\text {th }}$ number be $a_{6}$.
Mean $_{\text {new }}=\frac{a_{1}+a_{2}+a_{3}+a_{4}+a_{5}+a_{6}}{6}$
Mean $_{\text {new }}=31$ (given)
Now, from (1) and (2)
$31=\frac{150+a_{6}}{6}$
$a_{6}=186-150$
$a_{6}=36$

## Question 48. Consider the following statements:

(i) If the angles subtended by the chords of a circle at the centre are equal, then the chords are equal.
(ii) If two chords of a circle are equal, then their corresponding arcs are congruent.

Which of the following is CORRECT?
a. Both (i) and (ii) are TRUE
b. (i) is TRUE and (ii) is FALSE
c. (i) is FALSE and (ii) is TRUE
d. Both (i) and (ii) are FALSE

Answer: (a)
Solution:

Statement - I


In $\triangle A O B, \mathrm{AO}=\mathrm{BO}=\mathrm{r}$ and $\triangle C O D, \mathrm{CO}=\mathrm{DO}=\mathrm{r}$
Given that $\mathrm{G} A O B=$ GOD

By SAS congruence, $\triangle A O B \square \triangle C O D$
So, $A B=C D$ by CPCT. Hence the statement $-I$ is true.
Statement - II is also true by using,

$$
\left.\frac{\text { Length of arc }}{\text { Radius }}=\theta \text { (angle subtended by arc }\right)
$$

From the previous statement: Equal chords subtend equal angles at the centre.

Question 49. Area of the rhombus whose length of the diagonals are 9 cms and 12 cms respectively is
a. 45 sq. cms
b. 52 sq. cms
c. 54 sq. cms
d. 64 sq. cms

Answer: (c)
Solution:

Area of a rhombus $=\frac{1}{2}($ Product of diagonals $)=\frac{1}{2} \times d_{1} \times d_{2}$
$\mathrm{d}_{1}=9 \mathrm{cms}, \mathrm{d}_{2}=12 \mathrm{cms}$ (given)
Area of rhombus $=\frac{1}{2} \times 9 \times 12=54 \mathrm{~cm}^{2}$

Question 50. If the $8^{\text {th }}$ term of an arithmetic progression is 51 and $5^{\text {th }}$ term is 33 , then the sum of the first $\mathbf{1 0}$ terms of the arithmetic progression is
a. 312
b. 320
c. 345
d. 360

Answer: (d)

Solution:

We know that,
$\mathrm{n}^{\text {th }}$ term of an A.P. $=\mathrm{T}_{\mathrm{n}}=\mathrm{a}+(\mathrm{n}-1) \mathrm{d}$
$8^{\text {th }}$ term of an A.P. $=\mathrm{T}_{8}=51$ (given)
$\Rightarrow a+(8-1) d=51$
$\Rightarrow \mathrm{a}+7 \mathrm{~d}=51$
and $5^{\text {th }}$ term of A.P $=T_{5}=33$ (given)
$a+(5-1) d=33$
$a+4 d=33$
From (1) and (2), we get a $=9, d=6$
Sum of n terms of A.P $=\mathrm{S}_{\mathrm{n}}=\frac{n}{2}[2 a+(n-1) d]$
Sum of first 10 terms of A.P $=S_{10}=\frac{10}{2}[2 \times 9+(10-1) 6]=[18+54]=360$

Question 51. If the area of an equilateral triangle is $16 \sqrt{3}$ sq units then, the length of each side of the triangle is
a. 7 units
b. 8 units
c. 9 units
d. 10 units

Answer: (b)
Solution:
Since, Area of an equilateral triangle $=\frac{\sqrt{3}}{4}(\text { side })^{2}$
Let its side be a.

Now, $($ given, area $=16 \sqrt{3})$
$\frac{\sqrt{3}}{4}(a)^{2}=16 \sqrt{3}$
$\Rightarrow a^{2}=64$
$\Rightarrow a=8$ units

Question 52. The value of the expression
$\left[\sec \left(75^{\circ}-\theta\right)-\operatorname{cosec}\left(15^{\circ}+\theta\right)-\tan \left(55^{\circ}-\theta\right)+\cot \left(35^{\circ}+\theta\right)\right]$ is equal to
a. $\frac{3}{2}$
b. 0
c. -1
d. 1

Answer: (b)

Solution:
$\sec (75-\theta)=\sec [90-15-\theta]=\sec [90-(15+\theta)]$
$\Rightarrow \sec (75-\theta)=\operatorname{cosec}(15+\theta) \quad$ (Since, $\sec (90-\theta)=\operatorname{cosec} \theta)$
And $\tan (55-\theta)=\tan (90-35-\theta)=\tan (90-(35+\theta))$
$\Rightarrow \tan (55-\theta)=\cot (35+\theta) \quad$ (Since, $\tan (90-\theta)=\cot \theta)$
$\Rightarrow \sec (75-\theta)-\operatorname{cosec}(15+\theta)-\tan (55-\theta)+\cot (35+\theta)$
$=\operatorname{cosec}(15+\theta)-\operatorname{cosec}(15+\theta)-\cot (35+\theta)+\cot (35+\theta)=0$

Question 53. The perimeter of a rectangle is $\mathbf{9 0} \mathbf{c m s}$ and its breadth is $\mathbf{1 5} \mathbf{c m s}$. What is the area of the rectangle?
a. 450 sq cms
b. 400 sq cms
c. 390 sq cms
d. 320 sq cms

Answer: (a)

Solution:

Let the length of rectangle $=I$ and breadth $=b=15 \mathrm{~cm}$ (given)
Now, Perimeter of rectangle $=2(1+b)$
Given, perimeter $=90(\mathrm{cms})$
$90=2(1+15)$
$\mathrm{I}=30 \mathrm{cms}$
Now, area of rectangle $=1 \times b$
$30 \times 15=450$ sq. cms

Question 54. Two triangles $\triangle A B C$ and $\triangle D E F$ are similar. Their corresponding angles are:

$$
\begin{aligned}
& \angle A=\angle D \\
& \angle B=\angle E \\
& \angle C=\angle F
\end{aligned}
$$

The similarity between $\triangle A B C$ and $\triangle D E F$ can be symbolically expressed as
a. $\triangle \mathrm{CAB} \sim \triangle \mathrm{FDE}$
b. $\triangle \mathrm{CAB} \sim \triangle \mathrm{EFD}$
c. $\triangle \mathrm{BCA} \sim \triangle \mathrm{EDF}$
d. $\triangle \mathrm{BCA} \sim \triangle \mathrm{DFE}$

Answer: (a)

Solution:

Given that, in triangles $\triangle A B C$ and $\triangle D E F$
$\angle A=\angle D$
$\angle B=\angle E$
$\angle C=\angle F$
By AAA rule,
$\triangle A B C \sim \triangle D E F$
$\Rightarrow \triangle \mathrm{CAB} \sim \triangle \mathrm{FDE}$

Question 55. The quadratic equation $2 \mathbf{x}^{2}-\sqrt{7} \mathbf{x}+\mathbf{1}=\mathbf{0}$ has
a. more than two real roots
b. no real root
c. two equal real roots
d. two distinct real roots

Answer: (b)

Solution:
$2 x^{2}-\sqrt{7} x+1=0$
(Compare with $\mathrm{ax}^{2}+\mathrm{bx}+\mathrm{c}=0$ )
Now, discriminant, $D=b^{2}-4 a c=(-\sqrt{7})^{2}-4 \times 2 \times 1=7-6=-1$
Since, $\mathrm{D}<0$
Hence, roots will be imaginary or not real.

Question 56. In a school, all the 310 students have to study atleast one language among English, Hindi and German. 200 students study English, 220 students study Hindi and 180 students study German. 125 students study English and Hindi, 140 students study Hindi and German, 100 students study English and

German and 75 students study all the three subjects. How many students study only one language?
a. 95
b. 85
c. 80
d. 75

Answer: (a)
Solution:


From Venn diagram:

$$
\begin{align*}
& a+e+g+d=200  \tag{1}\\
& b+e+g+f=220  \tag{2}\\
& c+d+g+f=180  \tag{3}\\
& g+e=125  \tag{4}\\
& g+d=100  \tag{5}\\
& g+f=140  \tag{6}\\
& \text { and } g=75 \tag{7}
\end{align*}
$$

From eq. (4) and (7), we get

$$
e=50
$$

From eq. (4) and (5), we get

$$
d=25
$$

From equation (4) and (6),

$$
f=65
$$

Put value of d, e, fin eq. (3), we get
$c=15$
From equation (2),

$$
b=30
$$

From eq. (2) $\Rightarrow b=30$
From eq. (1) $\Rightarrow a=50$
$\Rightarrow$ Number of students studying only one language $=a+b+c$

$$
\begin{aligned}
& =50+30+15 \\
& =95
\end{aligned}
$$

Question 57. In a triangle $A B C$, if $B C=A C$ and angle $B=72$ degrees, then the measure of the angle $C$ is equal to
a. 72 degrees
b. 15 degrees
c. 42 degrees
d. 36 degrees

Answer: (d)
Solution:


Given that in $\triangle A B C, B C=A C$

$$
\Rightarrow \angle B=\angle A=72
$$

\{If two sides of a triangle are equal then angles opposite to the side are equal\} In $\triangle A B C$, we know that

$$
\begin{aligned}
& \angle \mathrm{A}+\angle \mathrm{B}+\angle \mathrm{C}=180 \\
& \angle \mathrm{C}=180-(72+72) \\
& \angle \mathrm{C}=36^{\circ}
\end{aligned}
$$

Question 58. If the complement of an angle is $1 / 5$ times of its supplement, then the angle is
a. 24.5 degrees
b. 67.5 degrees
c. 72.5 degrees
d. 86.5 degrees

Answer: (b)
Solution:

Let the angle be $\theta$.
Then, complement of angle $=90-\theta$
And supplement of angle $=180-\theta$
Given that,

$$
\begin{array}{ll}
\Rightarrow & 90-\theta=\frac{1}{5} \text { of }(180-\theta) \\
\Rightarrow & (90-\theta) \times 5=180-\theta \\
\Rightarrow & 450-50=180-\theta \\
\Rightarrow & 4 \theta=270 \\
\Rightarrow & \theta=67.5 \text { degrees }
\end{array}
$$

Question 59. A compound known as ammonium phosphate has the chemical formula
a. $\left(\mathrm{NH}_{4}\right)_{3} \mathrm{PO}_{4}$
b. $\left(\mathrm{NH}_{3}\right)_{3} \mathrm{PO}_{4}$
c. $\left(\mathrm{NH}_{4}\right)_{3} \mathrm{PO}_{3}$
d. $\left(\mathrm{NH}_{3}\right)_{3} \mathrm{PO}_{3}$

Answer: (a)

Solution:


Chemical Formula: $\left(\mathrm{NH}_{4}\right)_{3} \mathrm{PO}_{4}$

Question 60.From the Earth's surface, a stone is thrown vertically upwards with a velocity of $4 \mathrm{~ms}^{-1}$. During its motion, a downward acceleration due to gravity of $10 \mathrm{~ms}^{-2}$ acts on the stone. What will be the height attained by the stone?
a. 1.25 m
b. 1 m
c. 0.96 m
d. 0.8 m

Answer: (d)

Solution:

Given,
$\mathrm{u}=4 \mathrm{~m} / \mathrm{sec}$
$v=0$ (At the highest point)
$\mathrm{a}=-\mathrm{g}=-10 \mathrm{~m} / \mathrm{sec}^{2}$ (thrown upward)
$\mathrm{s}=\mathrm{h}$


From the $3^{\text {rd }}$ equation of motion,

$$
\begin{aligned}
& v^{2}=u^{2}+2 a s \\
& 0=(4)^{2}-2 \times 10 \times h \\
& h=\frac{16}{20}=0.8 \mathrm{~m}
\end{aligned}
$$

Question 61.An elderly woman can clearly watch birds flying at a large distance but is unable to read the newspaper. Which of the following statements is correct?
a. The near point of her eyes has come closer to her
b. The near point of her eyes has receded away
c. The far point of her eyes has come closer to her
d. The far point of her eyes has receded away

Answer: (b)
Solution:

The woman suffered from hypermetropia. So, the near point of the eye of woman recedes away.

Question 62. What is the value of the minimum resistance which can be made by connecting four resistors each of $1 / 4 \Omega$ ?
a. $1 / 4 \Omega$
b. $1 / 8 \Omega$
c. $1 \Omega$
d. $1 / 16 \Omega$

Answer: (d)
Solution:

When the resistors are connected in parallel combination then the equivalent resistance is minimum.
The equivalent resistance in parallel combination of n same resistors is given by

$$
\begin{aligned}
& \mathrm{R}_{\text {eq }}=\frac{R}{n} \\
& =\frac{1}{4 \times 4}=\frac{1}{16} \Omega \\
& \left\{\text { Since, } R=\frac{1}{4} \Omega \text { and } n=4\right\}
\end{aligned}
$$

Question 63. At room temperature, sucrose $\left(\mathrm{C}_{12} \mathrm{H}_{22} \mathrm{O}_{11}\right)$ has the appearance of a white solid powder. How many oxygen atoms are present in $\mathbf{1 7 . 1}$ grams of sucrose?
a. $6.022 \times 10^{22}$
b. $3.31 \times 10^{22}$
c. $3.31 \times 10^{23}$
d. $6.022 \times 10^{23}$

Answer: (c)
Solution:

Molecular formula of sucrose $=\mathrm{C}_{12} \mathrm{H}_{22} \mathrm{O}_{11}$
Molecular Mass of $\mathrm{C}_{12} \mathrm{H}_{22} \mathrm{O}_{11}=(12 \times 12)+(22 \times 1)+(11 \times 16)=342 \mathrm{~g}$
No. of molecules of sucrose $=(17.1 / 342) \times 6.022 \times 10^{23}$
Here, $6.022 \times 10^{23}=$ Avogadro number $\left(N_{A}\right)$
No. of oxygen atoms present in 17.1 gram of sucrose

$$
\begin{aligned}
& =(17.1 / 342) \times 6.022 \times 10^{23} \times 11 \\
& =3.31 \times 10^{23}
\end{aligned}
$$

Question 64. Two chemical species $A$ and $B$ chemically combine to form a product C . So, $\mathrm{A}+\mathrm{B} \rightarrow \mathrm{C}$.
$A$ and $B$ cannot be broken down into simpler substances by simple chemical reactions. Choose the alternative in which all the statements are correct.
(i) $A$ and $B$ are compounds.
(ii) C is a compound.
(iii) $A$ and $B$ are elements.
(iv) C has a fixed composition.
a. (i), (ii) and (iii)
b. (ii), (iii) and (iv)
c. (i), (iii) and (iv)
d. (i), (ii) and (iv)

Answer: (b)
Solution:

Elements cannot be broken down further into simpler substances by simple chemical reaction. Thus, A and B are elements whereas C is a compound which has a fixed composition.

Question 65. For testing pH of the soil, a student mixed a sample of soil thoroughly with distilled water and allowed the container to sit undisturbed. Blue litmus turned red on dipping in the soil-water mixture. Which of the following would change the colour of the red litmus to blue?
a. Common salt
b. Vinegar
c. Baking powder
d. Hydrochloric acid

Answer: (c)

Solution:

Soil- water mixture is acidic since it turns blue litmus to red.
Base turns red litmus to blue. Therefore, baking powder will produce a basic solution.

Question 66. Water is stored in a dam at a height above the ground. This stored water possesses
a. Potential energy
b. Electrical energy
c. Heat energy
d. Kinetic energy

Answer: (a)
Solution:
Water at a height above the ground possesses potential energy due to its position.

Question 67. A train starts from rest and moves with uniform acceleration. It attains a velocity of $72 \mathrm{~km} \mathrm{~h}^{-1}$ in 6 minutes. What is the acceleration of the train?
a. $1 / 12 \mathrm{~ms}^{-1}$
b. $1 / 15 \mathrm{~ms}^{-1}$
c. $1 / 18 \mathrm{~ms}^{-1}$
d. $1 / 21 \mathrm{~ms}^{-1}$

Answer: (c)
Solution:

Given:
$\mathrm{U}=0$ (start from rest)
$V=72 \mathrm{~km} / \mathrm{h}=72 \times \frac{5}{18} \mathrm{~m} / \mathrm{s}=20 \mathrm{~m} / \mathrm{s}$
$t=6$ minutes $=6 \times 60=360 \mathrm{sec}$
From $1^{\text {st }}$ equation of motion,
$\mathrm{v}=\mathrm{u}+\mathrm{at}$
$20=0+a \times 360$
$a=\frac{5}{18} \mathrm{~m} / \mathrm{s}^{2}$

Question 68.The reddening of the sun at sunrise and at sunset as viewed from the Earth's surface is due to
a. Dispersion of light
b. Atmospheric refraction of light
c. Scattering of light
d. Total internal reflection of light

Answer: (c)

## Solution:

The phenomena by which the sun looks red during sunsets and sunrise is known as scattering of light. The red colour is because of the rays of sunlight travelling greater distance through the Earth's atmosphere.

Question 69. The incident light is light from a point source. Which of the following can produce a parallel beam of light?
a. Concave mirror only
b. Two plane mirror placed at $90^{\circ}$ to each other
c. Convex lens only
d. Both concave mirror and convex lens

Answer: (d)
Solution:

When a point source is placed at the focus of the concave mirror and convex lens, because both are converging, we get a parallel beam of light.

Question 70. The atomic number of sulphur is 16 . The mass number of sulphur is 32. The number of electrons in $\mathbf{M}$-shell of sulphur is
a. 5
b. 6
c. 7
d. 8

Answer: (b)
Solution:

Atomic Number $=$ No. of Protons
Mass number $=$ No. of Protons + No. of Neutrons
For a neutral atom, No. of protons $=$ No. of electrons

Atomic Number of sulphur $=16$
Electronic configuration $=2,8,6$
No. of electrons in $M$ shell $=6$

Question 71. In a solar cooker, the phenomenon of greenhouse effect raises the temperature inside the solar cooker much higher than the temperature of the surroundings. Greenhouse effect in solar cookers is caused by
a. A double glass lid covering the inner box.
b. A reflective mirror fitted to the outer lid.
c. The outer box cover of the solar cooker.
d. The inner cooking box painted in black.

Answer: (a)

Solution:

The glass sheet in the solar cooker creates a Greenhouse effect. It has the property that allows the infra-red rays of shorter wavelength from the sun to get in the device but do not allow longer wave-length to leave the device. Therefore heat energy is trapped inside the heating device.

Question 72. Consider the following statements:
(i) Most carbon compounds are poor conductors of electricity.
(ii) Carbon compounds usually have strong forces of attraction between their molecules.
Which of the following is CORRECT?
a. Both (i) and (ii) are TRUE
b. (i) is TRUE and (ii) is FALSE
c. (i) is FALSE and (ii) is TRUE
d. Both (i) and (ii) are FALSE

Answer: (b)

Solution:

Carbon compounds are poor conductors of electricity as they do not have free electrons to conduct electricity. They share electrons to form covalent bonds. Also, carbon compounds do not dissociate into ions.

In covalent bonding, the intermolecular forces of attraction are weak.

Question 73. Choose the alternative that gives the correct answer. The particles of the following type of mixture scatter a beam of light passing through it and make its path visible.
(i) Solution
(ii) Suspension
(iii) Colloidal solution
a. Both (i) and (iii) are correct
b. Only (ii) is correct
c. Only (iii) is correct
d. Both (ii) and (iii) are correct

Answer: (d)

Solution:

Colloidal solutions scatter a beam of light and make its path visible. The particles of suspension may also scatter a beam of light.

Question 74. A 2 cm long alpin is fixed vertically in front of a vertically placed concave mirror. A 1 cm long image of the alpin is formed at a distance of $\mathbf{3 0} \mathbf{~ c m}$ in front of the mirror. The focal length of the concave mirror is
a. -60 cm
b. -45 cm
c. -30 cm
d. -20 cm

Answer: (d)

Solution:

Given:
$\mathrm{h}_{0}=2 \mathrm{~cm}$
$h_{i}=-1 \mathrm{~cm}$ (concave mirror)
$\mathrm{v}=-30 \mathrm{~cm}$ (concave mirror)
$\mathrm{u}=$ ?
$\mathrm{f}=$ ?
Magnification of concave mirror $m=\frac{h_{i}}{h_{0}}=\frac{-v}{u}$
$=\frac{-1}{2}=-\frac{-30}{u}$
$u=-60 \mathrm{~cm}$
Now by the mirror formula,

$$
\begin{aligned}
& \frac{1}{f}=\frac{1}{v}+\frac{1}{u} \frac{1}{\mathrm{f}}=\frac{1}{\mathrm{v}}+\frac{1}{\mathrm{u}} \\
& =\frac{1}{-30}+\frac{1}{-60}=\frac{-2-1}{60}=\frac{-3}{60}
\end{aligned}
$$

$$
\therefore f=-20 \mathrm{~cm}
$$

Question 75. Which of the following is a displacement reaction?
(i) $\mathrm{MgO}+\mathrm{H}_{2} \mathrm{O} \rightarrow \mathrm{Mg}(\mathrm{OH})_{2}$
(ii) On heating, $2 \mathrm{FeSO}_{4} \rightarrow \mathrm{Fe}_{2} \mathrm{O}_{\mathbf{3}}+\mathrm{SO}_{2}+\mathrm{SO}_{3}$
(iii) $4 \mathrm{Al}+3 \mathrm{O}_{2} \rightarrow 2 \mathrm{Al}_{2} \mathrm{O}_{3}$
(iv) $\mathrm{Zn}+\mathrm{FeSO}_{4} \rightarrow \mathrm{ZnSO}_{4}+\mathrm{Fe}$
a. (i)
b. (ii)
c. (iii)
d. (iv)

Answer: (d)
Solution:

A displacement reaction is the one wherein the atom or a set of atoms is displaced by another atom in a molecule.

$$
\mathrm{Zn}+\mathrm{FeSO}_{4} \rightarrow \mathrm{ZnSO}_{4}+\mathrm{Fe}
$$

Question 76. A person cannot see distinctly objects kept beyond 4m. For connecting this defect of vision, he needs a lens of power
a. -0.25 D
b. +0.25 D
c. +0.5 D
d. -0.5 D

Answer: (a)
Solution:

The person is suffering from myopia, so this defect can be corrected by using a concave lens of appropriate power.
$\mathrm{f}=4 \mathrm{~m}$
$\therefore$ power of concave lens
$\mathrm{P}=\frac{-1}{f}=\frac{-1}{4}=-0.25 \mathrm{D}$

Question 77. With reference to the magnetic field due to a current in a solenoid, consider the following statements:
(i) The relative strength of the magnetic field is shown by how faraway the magnetic field lines are. In other words, as the magnetic field becomes stronger, the distance between any two adjacent field lines increases.
(ii) The strong magnetic field produced inside the solenoid can be used to magnetize a piece of magnetic material like soft iron, when placed inside the coil.

## Which of the following is CORRECT?

a. Both (i) and (ii) are TRUE
b. (i) is TRUE and (ii) is FALSE
c. (i) is FALSE and (ii) is TRUE
d. Both (i) and (ii) are FALSE

Answer: (c)
Solution:

As the density of magnetic field lines is increased, the magnetic field becomes stronger i.e. the distance between two adjacent field lines should be the minimum.

Therefore, statement (i) is false.
Inside the solenoid magnetic field is stronger, so it is used to magnetize the magnetic material.

Therefore, the statement - (ii) is true.

Question 78.From a height $h$, a body has a free fall to the surface of the earth. After it has fallen a height $h / 2$, the body possesses
a. Both potential energy and kinetic energy, where potential energy is greater than kinetic energy.
b. Equal amounts of potential energy and kinetic energy.
c. Only kinetic energy.
d. Both potential energy and kinetic energy, where kinetic energy is greater than potential energy.

Answer: (b)

Solution:


Potential energy at point $B \Rightarrow m g h$
$=\frac{m g h}{2} \quad\left\{\right.$ Since, $\left.h=\frac{h}{2}\right\}$
Kinetic energy at point $\mathrm{B}=\frac{1}{2} m v^{2}{ }_{B}$
Applying the $3^{\text {rd }}$ equation of motion between $A B$,
$v^{2}=u^{2}+2 g h$
$v_{B}^{2}=0+2 g(0.5 h)=g h$
$\therefore$ Kinetic energy $=\frac{1}{2} m \times g h=\frac{m g h}{2}$
Therefore, at $\frac{h}{2}$; both potential and kinetic energies are the same.

Question 79. Before the main shock waves of an earthquake start, the first sound waves produced by an earthquake are of
a. Either Low frequency infrasound or high frequency ultrasound depending on the nature of earthquake.
b. Audible range of frequency for human beings.
c. Low frequency infrasound only.
d. High frequency ultrasound only.

Answer: (a)
Solution:

The P -waves travel fastest and are usually infrasonic but sometimes maybe in lower audible frequencies.

Question 80. Two conducting wires of the same material and of equal lengths and equal diameters are taken. They are first connected in series with a battery in circuit A. Next, they are connected in parallel with the same battery in circuit $B$. What is the ratio between the current through circuit A (in series) to the current through circuit B (in parallel)?
a. 1:2
b. $4: 1$
c. 1:4
d. 2:1

Answer: (c)

Solution:

Lengths, diameter (Area) and material are same for both the wires.
By $\mathrm{R}=\frac{\delta l}{A}$ their resistances are also the same.
Now,

$R e q=R_{1}+R_{2}=2 R$

$$
\mathrm{R}_{\mathrm{eq}}=\frac{R_{1} R_{2}}{R_{1}+R_{2}}=\frac{R . R}{R+R}=\frac{R}{2}
$$

From ohm's law,

$$
\mathrm{I}_{\mathrm{P}}=\frac{V}{R_{e q}}=\frac{V}{0.5 R}=\frac{2 V}{R}
$$

$V=I R$
$I_{s}=\frac{V}{R_{\text {eq }}}=\frac{V}{2 R}=\frac{\mathrm{V}}{2 \mathrm{R}}$
$\therefore \frac{I_{s}}{I_{p}}=\frac{V / 2 R}{2 V / R}=\frac{1}{4}$

Question 81. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. This chemical reaction is an example of
a. Double displacement reaction
b. Decomposition reaction
c. Displacement reaction
d. Combination reaction

Answer: (a)
Solution:

Double displacement reaction occurs when a part of two ionic compounds are exchanged and make two new components.

$$
\mathrm{BaCl}_{2}+\left(\mathrm{NH}_{4}\right)_{2} \mathrm{SO}_{4} \rightarrow \mathrm{BaSO}_{4}+2 \mathrm{NH}_{4} \mathrm{Cl}
$$

Question 82. A person speaking with a loud voice starts to talk softly. Which characteristic of the sound wave did the person reduce?
a. Wavelength
b. Amplitude
c. Time period
d. Frequency

Answer: (b)

Solution:

Since, Loudness $\propto\left(\right.$ Amplitude) ${ }^{2}$
Or
Intensity $\propto\left(\right.$ Amplitude) ${ }^{2}$
$\therefore$ When a person speaking with loud voice starts to talk, only amplitude has been changed.

Question 83. The laws of reflection hold good for
a. Concave mirror only
b. Plane mirror only
c. Convex mirror only
d. Concave mirror, plane mirror and convex mirror

Answer: (d)

Solution:

Laws of reflection are applicable for all kinds of mirrors like concave mirror, plane mirror and convex mirror.

Question 84. From the third law of motion, we can conclude that action and reaction always
a. Have the same magnitude and the same direction.
b. Act simultaneously on the same body.
c. Act simultaneously on different bodies in opposite directions.
d. Act simultaneously on different bodies normal (that is, at $90^{\circ}$ angle) to each other.

Answer: (c)
Solution:

According to $3^{\text {rd }}$ law of motion, action and reaction are equal in magnitude but opposite in direction as well as act on two different bodies.

Question 85. Who among the following Prime Ministers of India convened the National Integration Conference in 1961?
a. V. P. Singh
b. Lai Bahadur Shastri
c. Jawahartal Nehru
d. V.V Giri

Answer: (c)
Solution:
The National Integration Conference sought to address conflicts based on casteism, communalism, regionalis, linguism and narrow-mindedness and
formulate conclusions pertaining to them. Former Prime Minister of India, Jawaharlal Nehru convened the National Integration Conference in 1961.

## Question 86. Which of the following principal organs of the United Nations is NOT headquartered at New York?

a. The General Assembly
b. The Security Council
c. The Economic and Social Council
d. The International Court of Justice

Answer: (d)
Solution:
The International Court of Justice or the ICJ is headquartered at Hague, Netherlands. The ICJ is the principal court of the United Nations which seeks to settle disputes between nations in accordance with international laws. It was established in June 1945 by the Charter of the United Nations and started functioning from April 1946.

## Question 87. Which among the following is NOT a power of the Election

 Commission?a. Supervises the nomination of candidate
b. Appointment of ministers
c. Preparation of the electoral rolls
d. Allotment of symbols

Answer: (b)
Solution:
The Election Commission of India or the ECI is a constitutional body responsible for monitoring and regulating the entire election process in India right from overlooking the nomination of candidates, preparation of electoral rolls and allotment of symbols to political parties. Ministers are appointed by the President of India as per the advice of the Prime Minister.

Question 88. Treaty of Peace and Friendship between the Government of India and Government of Nepal, under which the Nepalese citizens can avail facilities and opportunities at par with Indian citizens was signed in the year:
a. 1949
b. 1950
c. 1956
d. 1960

Answer: (b)
Solution:
The Treaty of Peace and Friendship is a bilateral treaty between India and Nepal in order to foster a close strategic relationship between the two nations. The treaty is effective currently and was signed between the Prime Minister of Nepal, Mohan Shamsher Jang Bahadur Rana, and the Indian Ambassador to Nepal, Chandreshwor Narayan Singh on 31st July 1950.

Question 89. Which of the following Articles deals with the fundamental right, 'Right to Education'?
a. Article 16
b. Article 20A
c. Article 21A
d. Article 25

## Answer: (c)

## Solution:

According to Article 21 (A) of the Indian Constitution, the state of India state shall provide free and compulsory education to all children of the age of six to fourteen years. The Right to Education or the Right of Children to Free and Compulsory Education Act, 2009 is covered under Article 21A.

Question 90. Who appoints the Chief Election Commissioner and other Election Commissioners in India?
a. The Governor
b. The Chief Justice of India
c. The Prime Minister
d. The President

Answer: (d)
Solution:
The Chief Election Commissioner of India is appointed by the President of India. The Election Commissioner of India shall serve his/her term for up to 6 years. $\mathrm{He} /$ She can hold the office up to an age of 65 .

Question 91. As per the RTI act, which of the following is the CORRECT option with reference to the time period mandated for supply of information to an applicant in normal course?
a. Within 45 days from the receipt of application by the public authority
b. Within 7 days from the receipt of application by the public authority
c. Within 15 days from the receipt of application by the public authority
d. Within 30 days from the receipt of application by the public authority

Answer: (d)
Solution:
The Right to Information Act, 2005 empowers Indian citizens to acquire information from public authorities regarding matters of governance and public welfare. As per the RTI Act, an applicant can expect a response from the public authority within 30 days from the receipt of application.

Question 92. Which of the following options can be defined as the process of rapid integration or interconnection between countries due to which more and more goods and services, investments and technology are moving between countries?
a. Globalisation
b. Industrialisation
c. Colonization
d. Decentralization

## Answer: (a)

Solution:
Globalisation is a process in which trade and investment are interconnected and exchanged between various countries across the globe. Globalisation post-1990s rose dramatically and changed the socio-economic and political situations in various countries.

Question 93. Match the following:

| List-I | List-II |
| :--- | :--- |
| (i) Primary Sector | a. It includes activities that generate <br> services rather than goods |
| (ii) Secondary Sector | b. It includes economic activities that <br> produce goods by exploiting natural <br> resources |
| (iii) Tertiary Sector | c. It covers all the activities <br> directly related to scientific <br> research and innovation |
|  | d. It covers activities in which natural <br> products are charged into other forms <br> through some process of <br> manufacturing |

a. (i)-a., (ii)-c., (iii)-d.
b. (i)-b., (ii)-d., (iii)-a.
c. (i)-d., (ii)-c., (iii)-b.
d. (i)-c., (ii)-b., (iii)-a.

Solution:
The Primary sector contains activities which involve the production of goods extracted from natural resources on earth. Secondary sector refers to activities which involve the production of a finished product from the extracted raw materials. Tertiary sector involves services like communication, transportation, and finance that support primary and secondary sectors' production activities.

Question 94. Read the following statements and choose the CORRECT option. (i) Disguised unemployment occurs when the number of workers engaged in the job is much more than usually required to accomplish it.
(ii) Disguised unemployment is rampant in Indian agriculture owing to joint family system and lack of vocational avenues outside agriculture. (iii) Disguised unemployment occurs when people are not able to find employment for some part of the year and is prevalent only in agriculture sector.
(iv) Disguised unemployment is common in all wage earners and is a situation wherein marginal productivity of labour is always greater than unity
a. (i)-TRUE, (ii)-TRUE, (iii) - FALSE, (iv) - TRUE
b. (i)-TRUE, (ii)-FALSE, (iii) - TRUE, (iv) - FALSE
c. (i)-TRUE, (ii)-TRUE, (iii) - FALSE, (iv) - FALSE
d. (i)-FALSE, (ii) - TRUE, (iii) - FALSE, (iv) - TRUE

Answer: (c)

Solution:
Disguised unemployment is an unemployment situation that does not affect the aggregate economic output. It occurs when productivity is low and too many workers are filling too few jobs. For example, in India disguised unemployment prevails in agriculture. Agriculture involves a workforce or employment of $51 \%$ of India's total population. However, it contributes only $12 \%$ to $13 \%$ of the countries' total GDP.

Question 95. Which of the following options listed below can be categorised as the Modern Farming Methods that help in increasing agricultural production?
(i) Use of High Yielding Varieties (HVYs) of seeds.
(ii) Use of electrical pump sets, canal and dam water for irrigation.
(iii) Use of chemical fertilizers and pesticides.
(iv) Use of cow-dung and other natural manure as fertilizers.
(v) Use of cow-dung and other natural manure fertilizers.
(vi) Use of farm machinery like and threshers.
a. Only (i), (ii), (iii), (iv)
b. Only (ii), (iii), (iv), (vi)
c. Only (iii), (iv), (v), (vi)
d. Only (i), (ii), (iii), (vi)

Answer: (d)
Solution:
Modern farming methods aim to improve the productivity of agriculture in order to satisfy the demands of the rising population. Modern farming techniques include the use of High Yielding Variety (HYV) seeds, effective means of irrigation techniques using modern technology, rational usage of pesticides and fertilizers to improve the yield.

Question 96. Read the following statements and choose the CORRECT answer. (i) The concept of Poverty line is commonly used to identify poor and is estimated periodically (normally every five years) by conducting sample surveys which are carried out by the National Sample Survey Organisation (NSSO) in India.
(ii) International organisations like the World Bank use a uniform standard for the poverty line which is minimum availability of the equivalent of $\mathbf{\$ 1 . 9 0}$ per person per day, for making comparisons between developing countries.
a. (i) is TRUE and (ii) is FALSE
b. (i) is TRUE and (ii) is TRUE
c. (i) is FALSE and (ii) is TRUE
d. (i) is FALSE and (ii) is FALSE

Answer: (b)

Solution:
Poverty Line is a demarcation used to distinguish the poor people from the rest of the population. Presently as per NITI Aayog, the current poverty line in India is 1,059.42 Indian Rupees per month in rural areas and 1,286 Indian rupees per month in urban areas. However, the World Bank set an equivalent of $\$ 1.90$ per person per day in order to study comparisons between developing countries.

Question 97. This Act provides for food and nutritional security in human life at affordable prices and enables people to live a life with dignity, and under this act, $75 \%$ of the rural population and $50 \%$ of the urban population have been categorised as eligible households for food security. Identify the Act being referred to.
a. The National Food Security Act, 2013
b. Food Safety and Standards Act, 2006
c. The Prevention of Food Adulteration Act, 1954
d. Essential Commodities Act, 1955

Answer: (a)
Solution:
The National Food Security Act of 2013 was passed by the Government of India in order to ensure the availability, affordability and accessibility of food to its citizens. The scheme covers $75 \%$ of rural areas and $50 \%$ of urban areas by providing the required food items at affordable prices.

## Question 98. Match the following:

| List-I | List-II |
| :--- | :--- |
| (i) Revamped Public Distribution <br> System (RPDS) | a. Introduced in 2000 and was <br> specifically targeted towards 'indigent <br> senior citizens', |
| (ii) Antyodaya Anna Yojana (AAY) | b. Introduced in 1997 and for the first <br> time a differential price policy was <br> adopted for poor and nonpoor- |


| (iii) Targeted Public Distribution <br> System (TPDS) | c. Introduced in 1992 and the target <br> was to provide the benefits of PDS to <br> remote and backward areas. |
| :--- | :--- |
| (iv) Annapurna Scheme (APS) | d. Introduced in 2000 and was <br> specifically targeted towards 'poorest <br> of the poor'. |

a. (i)-a., (ii)-d., (iii)-b., (iv)-c.
b. (i)-c., (ii)-d., (iii)-b., (iv)-a.
c. (i)-d., (ii)-c., (iii)-b., (iv)-a.
d. (i)-d., (ii)-c., (iii)-d., (iv)-a.

Answer: (b)
Solution:
The Revamped Public Distribution System (RPDS) was introduced in 1992 and the target was to provide the benefits of PDS to remote and backward areas. The Antyodaya Anna Yojana (AAY) was introduced in 2000 and was specifically targeted towards the 'poorest of the poor'. The Targeted Public Distribution System (TPDS) was established in 1997 and for the first time a differential price policy was adopted for the poor and non-poor population. Annapurna Scheme (APS) was introduced in 2000 and was specifically targeted towards 'indigent senior citizens'.

Question 99. Which of the following terms is used to denote total value of all the final goods and services produced within the geographical boundaries of a country during a particular year?
a. Net National Product
b. Gross National Product
c. Net National Income
d. Gross Domestic Product

Answer: (d)

Solution:
Gross Domestic Product or the GDP denotes the total value of all final goods and services produced within the geographical boundaries of a country in a specified particular year. India ranks 6th in terms of GDP rankings. GDP is generally seen as a measure of a countries' economic growth.

Question 100. Given below are some of the terms related to Food Security system in India. Identity which one of the following terms is INCORRECTLY described
a. Public Distribution System - It is a system in which food procured by the FCl is distributed through government regulated ration shops among the poorer section of the society
b. Buffer Stock - It is the stock of foodgrains namely wheat and rice, procured by the government through the Food Corporation of India (FCI)
c. Fair Price Shop - It is a Ration shop that keeps stock of foodgrains, sugar and kerosene and these items are sold to people to people at a price lower than the market price
d. Issue Price - It is the price declared by the government every year before the sowing season to provide incentives to farmers for raising the production of the crops.

Answer: (d)
Solution:
Minimum Support Price is the price amount declared by the government every year before the sowing season to provide incentives to farmers for raising the production of the crops. Issue Price is the price at which the central government makes these food grains procured available to states.

