Question paper name- TG ICET 2024 5th June 2024 Shift 1

SECTION – A: ANALYTICAL ABILITY

1. Data Sufficiency

Note:
In questions numbered from 1 to 20, a question is followed by data in the form of two statements labelled as (I) and (II). You must decide whether the data given in the statements are sufficient to answer the questions. Using the data, make an appropriate choice from (1) to (4) as per the following guidelines:

(a) Mark choice (1) if the statement (I) alone is sufficient to answer the question.
(b) Mark choice (2) if the statement (II) alone is sufficient to answer the question.
(c) Mark choice (3) if both the statements (I) and (II) are sufficient to answer the question but neither statement alone is sufficient.
(d) Mark choice (4) if both the statements (I) and (II) together are not sufficient to answer the question and additional data are required.

SECTION – A: ANALYTICAL ABILITY

1. Data Sufficiency

Question 1
X is an integer. Is X divisible by 18?

(I) X is divisible by 6.
(II) X is divisible by 27.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.

4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (3)

Question 2

Is triangle ABC with sides of length a, b, c an isosceles triangle?

(I) $a^2 + b^2 = c^2$
(II) $(a + b - c)^2 = (b + c - a)^2$

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (2)

Question 3

What is the area of the square?

(I) The perimeter of the square is a multiple of 4.
(II) The diagonal of the square is $17\sqrt{2}$cm.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (2)

Question 4

Find the greatest of the numbers a, b, c and d.

(I) a - 40 = b - 50

(II) c - 60 = d - 70

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (4)

Question 5

Find the two digit number x.

(I) The difference between the number x and the one obtained by reversing it is 27.

(II) The number is greater than 5.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (4)

Question 6

Is the positive integer x is divisible by 10?

(I) x is the sum of five consecutive positive integers.

(II) x is divisible by 4.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (3)

Question 7

Among four friends P, Q, R, S, who is the tallest?

(I) Q is taller than P.

(II) R is shorter than Q, but taller than S.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (4)

Question 8

What is the value of $x^2 + y^2 + z^2 + t^2$?

(I) $x + y + z + t = 20$
(II) $xyzt = 300$

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (4)

Question 9

Find the two consecutive natural numbers.

(I) The difference of squares of the two consecutive numbers is 201.

(II) The numbers are greater than 50.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (1)

Question 10

Find the number of possible values of the natural number n.

(I) n divides 31n + 2024.

(II) n is greater than or equal to 1.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (1)

Question 11

What is the year of birth of Ramu?

(I) At present Ramu is 30 years younger to his father.

(II) Ramu's sister who was born in 1970 is 25 years is younger to her father.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (3)

Question 12

A number x is what percent of another number y?

(I) x and y are in the ratio 7:5.

(II) x = y + 40

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (1)

Question 13

What is the sum of two natural numbers?

(I) The sum of those two numbers added to their product is equal to 402.

(II) The two numbers are greater than 3.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (1)

Question 14

Is the integer K is an odd?

(I) 5K + 3 is even.

(II) 4K + 2 is even.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (1)

Question 15

Find the polynomial $f(x)$of degree 3 in which the coefficient of x^3 is 1.

(I) $f(x)$leaves remainder 1 when divided by $x-1$.

(II) $f(x)$leaves the same remainder 1 when divided by $x-2$and $x-3$.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (3)

Question 16

What is the two digit number?

(I) The sum of the two digits is 15.

(II) The ratio of the two digits is 3 : 2.

Options:

1. Statement (I) alone is sufficient to answer the question.

2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (3)

Question 17

Is x positive?

(I) $3x + y > 0$

(II) $x - y > 0$

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (3)

Question 18

Find the middle number of 11 consecutive integers.

(I) The product of the eleven consecutive integers is zero.

(II) The sum of those 11 consecutive numbers is zero.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.

3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (2)

Question 19

Are the $\triangle ABC$ and $\triangle PQR$ of same perimeter?

(I) $\angle B = \angle C = 90°$
(II) $\triangle ABC$ and $\triangle PQR$ are of same area.

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.
4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (4)

Question 20

For real x, is $| x - 4 | < 3$?

(I) $| x + 2 | > 3$
(II) $| x - 3 | < 4$

Options:

1. Statement (I) alone is sufficient to answer the question.
2. Statement (II) alone is sufficient to answer the question.
3. Both statements (I) and (II) together are sufficient to answer the question, but neither statement alone is sufficient.

4. Statements (I) and (II) together are not sufficient to answer the question.

Correct Answer: Option (3)

SECTION - A : ANALYTICAL ABILITY

2. Problem Solving

Question 21

AG 8 : DH 12 :: CN 17 : IO ____

1. 20
2. 24
3. 32
4. 40

Correct Answer: Option (2)

Question 22

$$\frac{\text{AHO}}{120} : \frac{\text{ELS}}{1140} :: \text{\_\_\_\_} : \frac{\text{FMT}}{1560}$$

Options:

1. $\frac{\text{BIP}}{144}$
2. $\frac{\text{BIP}}{432}$
3. $\frac{\text{BIP}}{288}$
4. $\frac{\text{BIP}}{576}$

Correct Answer: Option (3)

Question 23

BFJ (324):EIM (729):: _____:KOS (2025)

Options:

1. HLP (1296)
2. HPL (1024)
3. LHP (689)
4. LPH (1156)

Correct Answer: Option 1

Question 24

(3,4,73): (4,5,141):: (5,6,241): _____

Options:

1. (6, 7, 379)
2. (6, 7, 265)
3. (6, 7, 85)
4. (6, 7, 559)

Correct Answer: Option 1

Question 25

$A⑰D : E㊵H :: I㉕L : M㉕$_____

Options:

1. P
2. Q
3. R
4. O

Correct Answer: Option 1

Question 26

CHAIR : IRACH :: CROWN : _____

Options:

1. WNORC
2. WNPCR
3. WNOCR
4. VNOCR

Correct Answer: Option (3)

Question 27

AGENT : 25 :: PAINT : _____

Options:

1. 36
2. 49
3. 64
4. 81

Correct Answer: Option (4)

Question 28

BIRD : $8\frac{1}{4}$: : ___ : $7\frac{1}{4}$

Options:

1. BATH
2. CALM

3. EVEN
4. DOAR

Correct Answer: Option 2

Question 29

M 961 : P 3721 :: S 8281 : V _____

Options:

1. 343
2. 441
3. 225
4. 484

Correct Answer: Option 4

Question 30

CABLED (DALBEC) : ELOINS (ESOINL) :: DEWILY (YELIWD) : _____ (RIGNEH)

Options:

1. HONGIR
2. HINGER
3. HJNGIR
4. HINGOR

Correct Answer: Option (2)

SECTION - A : ANALYTICAL ABILITY

2. Problem Solving

A. Series (Odd things out)

Question 31

84, 120, 92, 105, 104, 85, 118

Options:

1. 118
2. 84
3. 105
4. 92

Correct Answer: Option (1)

Question 32

2, 6, 15, 28, 55, 76, 119

Options:

1. 15
2. 28
3. 76
4. 2

Correct Answer: Option (3)

Question 33

$$\frac{3}{2}, 4, \frac{11}{2}, 7, \frac{17}{2}, 10, \frac{25}{2}$$

Options:

1. 4
2. 7

3. $\frac{25}{2}$
4. $\frac{11}{2}$

Correct Answer: Option (3)

Question 34

MOON, MERCURY, JUPITER, SATURN, MARS, URANUS, NEPTUNE

Options:

1. JUPITER
2. SATURN
3. MOON
4. MERCURY

Correct Answer: Option (3)

Question 35

2, 3, 5, 13, 21, 43, 85

Options:

1. 13
2. 2
3. 5
4. 85

Correct Answer: Option (1)

SECTION - A : ANALYTICAL ABILITY

2. Problem Solving

A. Series (Missing numbers in sequence or series)

Question 36

35, 48, 80, 120, 168, 224, _____

Options:

1. 144
2. 255
3. 194
4. 285

Correct Answer: Option (2)

Question 37

9, 12.6, 16.2, 19.8, 23.4, 27, ____

Options:

1. 28.6
2. 30.2
3. 28.9
4. 30.6

Correct Answer: Option (4)

Question 38

362880, 181440, 60480, 15120, 3024, 504, _____

Options:

1. 72
2. 70
3. 68
4. 66

Correct Answer: Option (1)

Question 39

204, 140, 91, ___, 30, 14, 5

Options:

1. 50
2. 55
3. 60
4. 65

Correct Answer: Option (2)

Question 40

$$3, \frac{3}{\sqrt{2}}, \_\_, \frac{81}{2\sqrt{2}}, \frac{243}{4\sqrt{2}}, \frac{729}{4\sqrt{2}}$$

Options:

1. $\frac{27}{\sqrt{2}}$
2. 27
3. $\frac{27}{2}$
4. $27\sqrt{2}$

Correct Answer: Option (3)

Question 41

4√3, 8√3, 4√30, 8√15, 4√105, _____

Options:

1. 8√84
2. 8√40
3. 8√42
4. 48

Correct Answer: Option (3)

Question 42

10, 5√2, 5, 5/√2, 5/2, 5/2√2, ... , 5/4√2

Options:

(1) 10

(2) 5√2

(3) 5/8

(4) 5/4

Correct Answer: Option (4)

Question 43

3, 9, 8, 28, 15, 65, 24, _____

Options:

(1) 102
(2) 98
(3) 105
(4) 126

Correct Answer: Option (4)

Question 44

AD4, AF9, _____, BB5, BE6, BH9, CB4

Options:

(1) AI6
(2) AB5
(3) AB1
(4) AE9

Correct Answer: Option (1)

Question 45

7, 26, 124, 342, _____, 2196, 4912

Options:

(1) 958
(2) 1730
(3) 1431
(4) 1330

Correct Answer: Option (4)

SECTION - A : ANALYTICAL ABILITY

2. Problem Solving

B. Data Analysis

Data Table: An article A is produced by five machines whose efficiencies are shown in the following table.

Machine	No. of articles A produced	% of Defective articles
M1	1200	10
M2	900	12
M3	960	5
M4	720	15
M5	1500	18

Based on this information, answer the questions from 46 to 48

Question 46

Total number of defective articles produced by all the machines is:

Options:

(1) 652

(2) 653

(3) 654

(4) 655

Correct Answer: Option (3)

Question 47

Ratio of defective articles to the ones non defective is:

Options:

(1) 109 : 771
(2) 327 : 2640
(3) 109 : 773
(4) 327 : 771

Correct Answer: Option (1)

Question 48

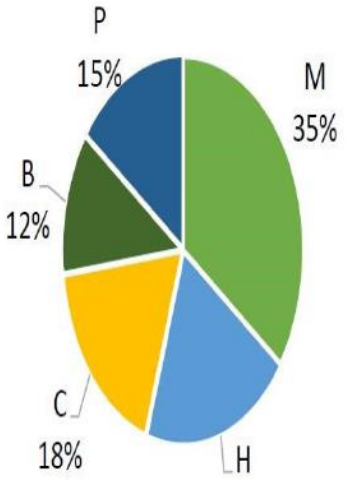
Approximately what percent of total articles produced are defective?

Options:

(1) 10.4
(2) 9.4
(3) 8.4
(4) 12.4

Correct Answer: Option (4)

The following pie chart shows the percentages of number of students studying five courses: Mathematics (M), Humanities (H), Physics (P), Biology (B), Chemistry (C) in a college for the year 2023.



Based on this information, answer the questions from 49 to 51

Question 49

If the total number of students of that college is 3800, then how many students are studying Humanities?

Options:
(1) 570
(2) 380
(3) 760
(4) 950

Correct Answer: Option (3)

Question 50

What is the sectorial angle in (degrees) corresponding to the number of students studying Physics in that college?

Options:

(1) 126

(2) 54

(3) 72

(4) 60

Correct Answer: Option (2)

Question 51

What is the ratio between the number of students studying Physics and the total number of students studying Chemistry and Biology?

Options:

(1) 10 : 9

(2) 2 : 1

(3) 9 : 10

(4) 1 : 2

Correct Answer: Option (4)

Comprehension Data (Questions 52 to 55)

A survey conducted on 210 persons about the readership of three dailies I, H, J, revealed the following information.

80 read I, 95 read H, 85 read J. The number of people who read H and J but not I is three times that of who read all the three. The number of people who read only J is 40. The number of people who read J and I is 5 more than that who read all the three. The number of people who read I and H but not J is 5 less than that of who read all the three.

Using this information answer the following questions from 52-55.

Question 52

The number of people who do not read any of three papers is:

Options:

(1) 8

(2) 9

(3) 10

(4) 11

Correct Answer: Option (3)

Question 53

The number of people who read all the three is

Options:

(1) 9

(2) 10

(3) 11

(4) 12

Correct Answer: Option (2)

Question 54

The number of people who read only H is

Options:

(1) 35

(2) 40

(3) 45

(4) 50

Correct Answer: Option (4)

Question 55

The number of people who read only I is

Options:

(1) 60

(2) 65

(3) 68

(4) 69

Correct Answer: Option (1)

Comprehension (Questions 56 to 60)

Letters of the English alphabet are coded as follows:
Denote the letters **A, B, C, …, Z** by the numbers **1, 2, 3, …, 26**.

For $1 \leq k \leq 13$, code the k^{th}letter to the $(27-k)^{th}$letter.

For $14 \leq k \leq 26$, code the k^{th}letter to the $(k-13)^{th}$letter.

Using this coding pattern, answer the questions from **56 to 60**.

Question 56
Code word for SECRET is

Options:

(1) FVXFVG

(2) FVYEVG

(3) FVXEVG

(4) FVZEVG

Correct Answer: Option (3)

Question 57
Which word is coded as CRIME?
Options:

(1) PIVZR

(2) PIVXR

(3) PIYZR

(4) PIVRZ

Correct Answer: Option (1)

Question 58

Which word is coded as EXTINCT?

Options:

(1) RCFVMPG

(2) RCGWNPG

(3) RCGWMPG

(4) RCGVMPG

Correct Answer: Option (4)

Question 59

Code word for ELECTION is

Options:

(1) VOVYGRBA

(2) VOUXGRBA

(3) VOVXGRBA

(4) VOVXHRBA

Correct Answer: Option (3)

Question 60

Which word is coded as DESIGN?

Options:

(1) QRHVTM

(2) QRGVTM

(3) QRHYTM

(4) QRHUTM

Correct Answer: Option (1)

Question 61

BEAUTIFUL is coded as 986154210 and TUBEFUL is coded as 5198210, then the code word for FUTILE is Options:

(1) 214408

(2) 216408

(3) 215408

(4) 215308

Correct Answer: Option (3)

Question 62

If NATURE is coded as ANUTER, then the code of ABACUS is

Options:

(1) BACASU

(2) BAACSU

(3) AABCUS

(4) ASUBCA

Correct Answer: Option (1)

Question 63

In a certain code language DREAM is coded as @!#*% and FROG is coded as <!? > then the code for FREEDOM is

Options:

(1) <!@@#?%

(2) <!##@?%

(3) >!##?@%

(4) <!??@#%

Correct Answer: Option (2)

Question 64

If MOLES is coded as 64 and STATE is coded as 65, then the code for CENTRE is

Options:

(1) 65

(2) 66

(3) 67

(4) 68

Correct Answer: Option (1)

Question 65

If COMPUTER is coded as OCMOVTRE, then the word coded as LAPGBBTE is

Options:

(1) APLAHBET

(2) ALHPABTE

(3) ALAPHBET

(4) ALPHABET

Correct Answer: Option (4)

Question 66

The year 2025 ends with the day

Options:

(1) Monday

(2) Tuesday

(3) Wednesday

(4) Thursday

Correct Answer: Option (3)

Question 67

The ratio of the acute angles between the hands of a clock at 5:10 am and 5:20 pm is

Options:

(1) 21 : 8

(2) 19 : 7

(3) 19 : 8

(4) 17 : 5

Correct Answer: Option (3)

Question 68

What time between **4 o'clock and 5 o'clock** will the hands of a clock be on the **same straight line but not together**?

Options:

1. $54\frac{6}{11}$minutes past 4
2. $53\frac{5}{11}$minutes past 4
3. $49\frac{6}{11}$minutes past 4
4. $51\frac{5}{11}$minutes past 4

Correct Answer: Option (1)

Question 69

A is my father's brother's wife's son. Then, A is related to me as

Options:

(1) Nephew

(2) Brother-in-law

(3) Grandson

(4) Cousin Brother

Correct Answer: Option (4)

Question 70

Three persons A, B and C reached a railway station in such a way that C reached the station 55 minutes before A while B reached 1 hour 15 minutes after A reached the station. Further A came to know that he reached the station 30 minutes before the scheduled departure of train at 11.10 am. By how much time C reached earlier than B?

Options:

(1) 2 hours 20 min

(2) 2 hours

(3) 2 hours 10 min

(4) 2 hours 40 min

Correct Answer: Option (3)

Question 71

Ashok wants to make a trip of 30 km by bicycle. He leaves 3 minutes late, but travels 1 kmph faster and arrives on time. Then the speed of cyclist Ashok (in kmph) is

Options:

(1) 24

(2) 26

(3) 27

(4) 20

Correct Answer: Option (1)

Question 72

Five persons P, Q, R, S and T sit around a circular table facing centre, as described below. T is second right to R and is also 2^{nd} left to P. Q and S are neighbours to T. S is not sitting between R and T. Then who is to the immediate left of P?

Options:

(1) T

(2) Q

(3) R

(4) S

Correct Answer: Option (4)

Question 73

Let $m$and $n$be any integers. If $m\ \alpha\ n = 3m + 2n, m\ \beta\ n = 2m + 3n$,and $m\ \gamma\ n = m^2 + n^3$, then $(1\ \alpha\ 2)\ \beta\ (3\ \gamma\ 4) =\ ?$

Options:

1. 209
2. 219
3. 233
4. 239

Correct Answer: Option (3)

Question 74

If $a \oplus b = a^b + b$and$a * b = \frac{a+b}{b-a}$, then $(1 \oplus 2) * (3 \oplus 4) =$?

Options:

1. $\frac{41}{44}$
2. $\frac{41}{47}$
3. $\frac{44}{41}$
4. $\frac{47}{41}$

Correct Answer: Option (3)

Question 75

For real x, y, let $x \vee y = (x + y)^2 + (x - y)^2andx \wedge y = (x + y)^2 - (x - y)^2$. If $5 \wedge (6 \vee (-7)) = x \vee (1 \wedge 3)$, then $x^2 =$?

Options:

1. 1556
2. 1656
3. 1456
4. 1558

Correct Answer: Option (1)

SECTION - B: MATHEMATICAL ABILITY

1. Arithmetical Ability

Question 76

$$\left[\left(\sqrt[3]{2^{-\frac{4}{3}}}\right)^{-\frac{3}{4}}\right]^{-3} =$$

Options:

1. 2
2. $\frac{1}{2}$
3. 4
4. $\frac{1}{4}$

Correct Answer: Option (2)

Question 77

$$\frac{\left(\frac{31}{51}\right)^2 - \left(\frac{51}{31}\right)^2}{\frac{31}{51} - \frac{51}{31}} - \frac{\left(\frac{31}{51}\right)^3 - \left(\frac{51}{31}\right)^3}{\left(\frac{31}{51}\right)^2 - \left(\frac{51}{31}\right)^2} = \frac{k}{31^2 + 51^2} \Rightarrow k =$$

Options:

1. 1580
2. 1581
3. 1582
4. 1583

Correct Answer: Option (2)

Question 78

If $A:B = \frac{1}{4}:\frac{1}{5}$ and $B:C = \frac{1}{8}:\frac{1}{7}$, then $\frac{4A+2B+2C}{3B+C} = ?$

Options:

1. $\frac{27}{65}$
2. $\frac{29}{65}$
3. $\frac{65}{29}$
4. $\frac{65}{27}$

Correct Answer: Option (3)

Question 79

Ratio of two numbers is $3:5$.

If x is added to each number, their ratio becomes $7:5$.

The **sum of the squares** of those numbers in terms of x is:

Options:

1. $\frac{9}{25}x^2$
2. $\frac{7}{20}x^2$
3. $\frac{17}{25}x^2$
4. $\frac{17}{50}x^2$

Correct Answer: Option (4)

Question 80

Calculate the value of: $\frac{2+\sqrt{3}}{\sqrt{2}+\sqrt{2+\sqrt{3}}}+\frac{2-\sqrt{3}}{\sqrt{2}-\sqrt{2-\sqrt{3}}}$

Options:

(1) $2\sqrt{2}$

(2) $3\sqrt{2}$

(3) $\frac{\sqrt{2}}{2}$

(4) $\sqrt{2}$

Correct Answer: Option (4)

Question 81

If $a=\sqrt{4+\sqrt{15}}, b=\sqrt{4-\sqrt{15}}$, then $a+b=$

Options:

1. $2\sqrt{2}$
2. $\sqrt{10}$
3. 3
4. 4

Correct Answer: Option (2)

Question 82

Let $a$be a two-digit number and $b$be the number obtained by reversing its digits.
If $ab=7663$, then the difference of these two numbers is

Options:

1. 27
2. 12
3. 18

4. 36

Correct Answer: Option (3)

Question 83

The units digit in the number $61 \times 62 \times 63 \times 64 \times 66 \times 67 \times 68$ is

Options:

1. 4
2. 6
3. 8
4. 2

Correct Answer: Option (1)

Question 84

If the LCM of
$31,32,35,36,37,38,39,40,$and $43$is N,
Then the LCM of
$31,32,35,36,37,38,39,40,43,44,45,48,$and 50,
in terms of N, is

Options:

1. $50N$
2. $44N$
3. $11N$
4. $5N$

Correct Answer: Option (3)

Question 85

Which of the following is **not** a divisor of $7^{42} - 1$?

Options:

1. $7^3 - 1$
2. $7^6 - 1$
3. $7^8 - 1$
4. $7^7 - 1$

Correct Answer: Option (3)

Question 86

If $0.3\bar{7}\bar{5} = \frac{p}{q}$, where $p$and $q$are relatively prime, then $3p - q =$

Options:

1. 23
2. 19
3. 52
4. 21

Correct Answer: Option (4)

Question 87

$$1000\left\{(0.07776)^{\frac{2}{5}} + (0.125)^{\frac{2}{3}}\right\} =$$

Options:

1. 6.1
2. 0.61
3. 61
4. 610

Correct Answer: Option (4)

Question 88

Ascending order of the numbers $\frac{65}{63}, \frac{41}{40}, \frac{13}{14}, \frac{25}{24}, \frac{37}{35}$ is

Options:

1. $\frac{13}{14}, \frac{41}{40}, \frac{65}{63}, \frac{25}{24}\ \frac{37}{35}$
2. $\frac{13}{14}, \frac{65}{63}, \frac{41}{40}, \frac{25}{24}, \frac{37}{35}$
3. $\frac{13}{14}, \frac{25}{24}, \frac{41}{40}, \frac{65}{63}, \frac{37}{35}$
4. $\frac{37}{35}, \frac{13}{14}, \frac{41}{40}, \frac{65}{63}, \frac{25}{24}$

Correct Answer: Option (1)

Question 89

Decreasing order of the numbers

$7-4\sqrt{3}, 8-3\sqrt{7}, 4-\sqrt{15}, 6-\sqrt{35}, 5-2\sqrt{6}$ is

Options:

1. $4-\sqrt{15,8}-3\sqrt{7}, 7-\ 4\sqrt{3}, 6\ -\sqrt{35}, 5-2\sqrt{6}$
2. $7-4\sqrt{3}, 6-\sqrt{35}\ , 5-2\sqrt{6}, 4-\sqrt{15}, 8-3\sqrt{7}$
3. $4-\sqrt{15}, 5-2\sqrt{6}, 6-\sqrt{35},\ 7-\ 4\sqrt{3}, 8\ -\ 3\sqrt{7}$
4. $8-3\sqrt{7}\ , 6-\sqrt{35}, 7-\ 4\sqrt{3}, 5-2\sqrt{6}, 4-\sqrt{15}$

Correct Answer: Option (3)

Question 90

If $(x+2y)$percent of $(x+2y+3z)$is the same as $(2y+3z)$percent of $(x+2y+3z)$, then the relation between $x$and $z$is

Options:

1. $x=4z$
2. $x=6z$

3. $x = 3z$
4. $x = 5z$

Correct Answer: Option (3)

Question 91

If the sum of two numbers is $\frac{27}{20}$of the first number, then the second number is what percent of the first number?

Options:

1. 25
2. 35
3. 30
4. 33

Correct Answer: Option (2)

Question 92

The cost price of an article is C and its marked price is M. By allowing a discount of 10% on marked price, one gains 10% profit. Then the relation between M and C is

Options:

(1) 11M = 9C

(2) 7M = 11C

(3) 9M = 13C

(4) 9M = 11C

Correct Answer: Option (4)

Question 93

An article costs Rs.12500. Marked price is fixed 30% extra over its cost price and is allowed 8% discount while selling. If the article is sold out, then profit earned (in rupees) is

Options:

(1) 2540

(2) 2405

(3) 2650

(4) 2450

Correct Answer: Option (4)

Question 94

Three persons A, B and C enter into a partnership business with the investments in the ratio **5 : 4 : 3**.

A withdraws his investment at the end of **6 months**, B also leaves the business by withdrawing his investment at the end of **9 months**.

C continues till the end.

If the year-end profit is **Rs. 1,53,000**, then the share of **A (in rupees)** is:

Options:

(1) 63,000
(2) 45,000
(3) 54,000
(4) 36,000

Correct Answer: Option (2)

Question 95

Two persons A and B begin a joint venture with the investments in the ratio 4:5. Another person C joins the business in the beginning of 3rd quarter with an investment equal to that of A. In the year-end profit if the C's share is Rs. 24400. then A's share (in rupees) is.

Options:

(1) 24400
(2) 48800

(3) 32200
(4) 12200

Correct Answer: Option (2)

Question 96

Two pipes A and B can fill a tank in 6 hours and 8 hours respectively, while pipe C can empty the tank in 12 hours. If all the three pipes are opened at the same time, then the time taken to completely fill the tank (in hours)?

Options:

(1) 5
(2) 6
(3) 6.2
(4) 4.8

Correct Answer: Option (4)

Question 97

There are three taps A, B, C which are used to fill an empty water tank T. A can fill the empty tank in *x* hours. B and C individually empty the full tank in *y* and *z* hours respectively. When the tank is empty, all the three taps are opened. Then the time taken to fill the empty tank is (in hours).

Options:

(1) $\frac{xyz}{xy-yz-zx}$

(2) $\frac{xyz}{yz-zx-xy}$

(3) $\frac{xyz}{xy+yz-zx}$

(4) $\frac{xyz}{xy+yz+zx}$

Correct Answer: Option (2)

Question 98

Mohan goes to his office by walk. If he walks with the speed of 5 kmph, he will be late by 4

minutes and if he increases his speed by 1 kmph, he reaches 4 minutes early. Then the distance between his home and office is

Options:

(1) 4 km
(2) 3 km
(3) 3.5 km
(4) 4.5 km

Correct Answer: Option (1)

Question 99

A car leaves the station A with a speed of 60 kmph and arrives at station B in 40 minutes.
From B, the car moves towards the station C and reaches it in 40 minutes.
If the average speed of the car in travelling from A to C is 80 kmph, then the distance between A and C (in km) is

Options:

(1) 120

(2) 125

(3) 140

(4) 100

Correct Answer: Option (1)

Question 100

Three persons A, B and C together can finish a job in 8 days.
B and C together can finish the same job in 45 days.
A and C together can finish the job in 24 days.
If A, B and C individually finish the job in x, y and z days respectively, then the ratio of x : y : z is

Options:

(1) 3 : 8 : 10

(2) 5 : 12 : 20

(3) 4 : 3 : 20

(4) 5 : 4 : 20

Correct Answer: Option (2)

Question 101

One day work is performed by P in x days, Q in x days in the ratio 5 : 2.
If Q and R together can finish the job in 6 days, then P and Q together can finish the same job in how many days?

Options:

(1) 3

(2) 4

(3) 6

(4) 5

Correct Answer: Option (4)

Question 102

Consider the rectangle ABCD with E, F being points of intersection on BC.
The ratio of areas of triangles DABE and DAFB is

Options:

(1) 4 : 5

(2) 4 : 7

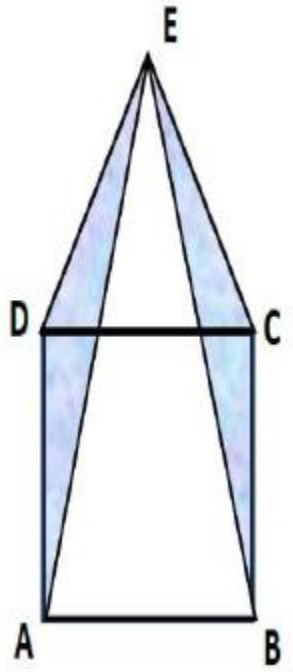
(3) 3 : 4

(4) 5 : 7

Correct Answer: Option (1)

Question 103

Consider the given figure, where in $\triangle ADC$, line BC is an internal segment.
Let A be the scale of the trapezium. Find the area of the shaded region (in sq. units).



Options:

(1) $a^2 / 4$

(2) $a^2 / 3$

(3) $a^2 / 2$

(4) a^2

Correct Answer: Option (4)

Question 104

If the ratio of the radii of two cones is 2 : 5 and their slant heights are in the same ratio, then the ratio of their volumes is

Options:

(1) 8 : 49

(2) 4 : 25

(3) 72 : 125

(4) 8 : 125

Correct Answer: Option (3)

Question 105

If the total area of a right circular cone of radius 7 cm and slant height 25 cm is (in sq. cm), then it is equal to

Options:

(1) $1100\pi / 7$

(2) 1100π

(3) 2000π

(4) $1000\sqrt{2}$

Correct Answer: Option (1)

Question 106

A rectangular room has floor dimensions 9 ft × 12 ft, with the height of the room being 9 ft. Four walls are to be painted. If the painting cost per sq.ft. is Rs. 40, then the total cost for painting four walls (in rupees) is

Options:

(1) 16000

(2) 15240

(3) 15120

(4) 15000

Correct Answer: Option (3)

Question 107

There is a rectangular field of dimension 250 × 200 m^2. It is decided to go for fencing along the boundary, with a provision for a gate of width 4 m along the smaller side. The gate costs Rs. 15000. The total expenditure including gate cost, incurred in fencing this field is Rs. 131480, then the cost of fencing (only) per meter is

Options:

(1) 125

(2) 130

(3) 140

(4) 145

Correct Answer: Option (2)

Question 108

The radius and slant height of a cone are in the ratio 5 : 14. If its curved surface area is 3520 cm^2, then the radius is (in cms) (take $\pi = 22/7$)

Options:

(1) 14

(2) 28

(3) 15

(4) 20

Correct Answer: Option (1)

Question 109

The remainder when 37^{65} is divided by 8 is

Options:

(1) 5

(2) 3

(3) 7

(4) 1

Correct Answer: Option (1)

Question 110

The smallest positive integer with four digits that satisfies $13x \equiv 1 \pmod{15}$ is

(1) 1012

(2) 1039

(3) 1056

(4) 1073

Correct Answer: Option (1)

SECTION - B: MATHEMATICAL ABILITY

2. Algebraic and Geometrical Ability

Question 111

Let S = {k | k is a natural number, $1 \leq k \leq 150$}.

A = {k ∈ S | k is a multiple of 6} and

B = {k ∈ S | k is a multiple of 10}.

Then the total number of elements in the set $(A \cup B) - (A \cap B)$ is

Options:

(1) 45

(2) 40

(3) 35

(4) 30

Correct Answer: Option (4)

Question 112

$A = \{x \in R : |x - 3| < 3\}$, $B = \{x \in R : |x - 2| < 4\} \Rightarrow A \cap B =$

Options:

(1) $A \cup B$

(2) B

(3) A

(4) φ

Correct Answer: Option (3)

Question 113

If p(x) = $x^3 - x^2 - 8x + 12$ and q(x) = $x^3 + 4x^2 - 3x - 18$, then GCD of p(x) and q(x) is

Options:

(1) x − 1

(2) $(x - 1)^2$

(3) x − 2

(4) $(x - 2)^2$

Correct Answer: Option (3)

Question 114

If the sum of zeros of the cubic polynomial $p(x) = 3x^3 - k(k-2)x^2 + 6x + 24$is **5**, then the possible values of $k$are:

Options:

1. $-5,3$
2. $-5,-3$
3. $5,3$
4. $5,-3$

Correct Answer: Option (4)

Question 115

If $p(x) = x^3 + 2x^2 + ax + b$leaves remainders **0** and **1** when divided by $x - 1$and $x - 2$respectively, then $a^2 + b^2 =$

Options:

1. 121
2. 196
3. 100

4. 225

Correct Answer: Option (4)

Question 116

The remainder when
$x^3 + 3x^2 + 7x - 6$is divided by $(x-2)$is:

Options:

1. 24
2. 26
3. 28
4. 12

Correct Answer: Option (3)

Question 117

The common solution of the equations
$12x - 7xy + 12y = 0$and
$12x + 5xy - 24y = 0$is (x_0, y_0). Then

$$x_0^2 + y_0^2 =$$

Options:

1. 13
2. 27
3. 25
4. 18

Correct Answer: Option (3)

Question 118

If $x = \sqrt{5 + \sqrt{21}}$, $y = \sqrt{5 - \sqrt{21}}$, then $x + y + xy =$

Options:

1. $2+\sqrt{14}$
2. $4+\sqrt{14}$
3. $4-\sqrt{14}$
4. $\sqrt{14}-2$

Correct Answer: Option (1)

Question 119

If $x^2+y^2+z^2=xy+yz+zx, x\neq 0$, then $\frac{15x+4y+5z}{8x}=$

Options:

1. 3
2. 4
3. 2
4. 5

Correct Answer: Option (1)

Question 120

If the $10^{th}$and 20^{th}terms of an arithmetic progression are **66** and **106** respectively, then the 15^{th}term is:

Options:

1. 82
2. 78
3. 86
4. 94

Correct Answer: Option (3)

Question 121

If the $p^{th}$and q^{th}terms of an arithmetic progression are $q$and $p$respectively, then the 2024^{th}term of the progression is:

Options:

1. $p + q - 2023$
2. $p + q + 2023$
3. $p + q - 2024$
4. $p + q + 2024$

Correct Answer: Option (3)

Question 122

If $\cot\ \theta = \frac{5}{12}$ then $\frac{1+\cos\ \theta}{1-\sin\ \theta} =$

Options:

1. 20
2. 18
3. 30
4. 28

Correct Answer: Option (2)

Question 123

$$\sin^2 30° + \cos^2 45° + \sin^2 60° + \cos^2 120° + \sin^2 150° =$$

Options:

1. $\frac{3}{2}$

2. $\frac{5}{2}$
3. 1
4. 2

Correct Answer: Option (4)

Question 124

If $a\cos\ \theta + b\sin\ \theta = c$ and $a\sin\ \theta - b\cos\ \theta = d$ then:

Options:

1. $a^2 + b^2 = c^2 + d^2$
2. $a^2 - b^2 = c^2 - d^2$
3. $a^2 + 2b^2 = c^2 + d^2$
4. $2a^2 + 3b^2 = c^2 + d^2$

Correct Answer: Option (1)

Question 125

$$\frac{5}{1+\cot^2\theta} + \frac{4}{1+\tan^2\theta} + \cos^2\theta =$$

Options:

1. 1
2. 9
3. 5
4. 0

Correct Answer: Option (3)

Question 126

CD is a tower of height $25\sqrt{3}$m, with the top at D. Points A and B are on the same straight line with C and on the same side.
If a person standing on the top of the tower observes the angles of depression of A and B as $30°$and $60°$respectively, then the distance between A and B (in metres) is:

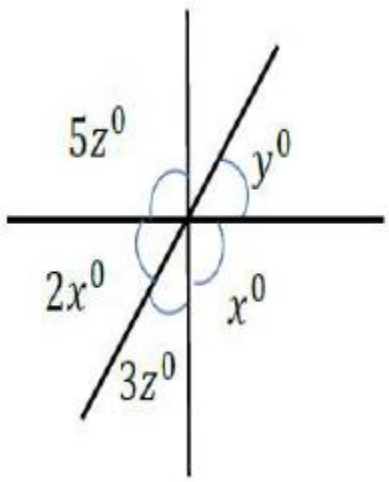
Options:

1. 60
2. 75
3. 50
4. 45

Correct Answer: Option (3)

Question 127

In the following figure, what is the value of x?



Options:

1. 37
2. 38.5
3. 50
4. 36

Correct Answer: Option (3)

Question 128

If the bisectors of angles $\angle ABC$ and $\angle ACB$ of triangle ABC meet at point O and $\angle A = 60°$, then $\angle BOC =$

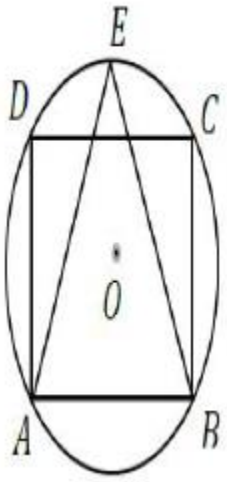
Options:

1. $135°$
2. $120°$
3. $105°$
4. $75°$

Correct Answer: Option (2)

Question 129

In the following figure, if $ABCD$ is a square and the circle with centre O has radius 6cm, then the area of $\triangle EAB$ (in sq. cm) is:



Options:

1. $18(\sqrt{2}+1)$
2. $16(\sqrt{2}+1)$
3. $14(\sqrt{2}+1)$

4. $20(\sqrt{2}+1)$

Correct Answer: Option (1)

Question 130

Suppose $ABCD$ is a quadrilateral. If the sum of the lengths of the perpendiculars drawn from A and C to the diagonal BD of length 10cm is 18cm, then the area of quadrilateral $ABCD$ (in sq. cm) is:

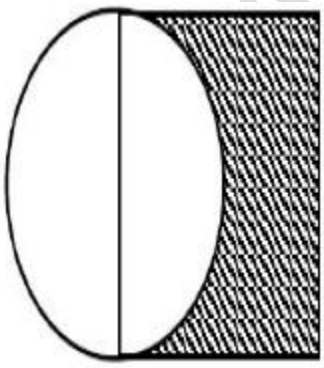
Options:

1. 180
2. 100
3. 80
4. 90

Correct Answer: Option (4)

Question 131

In the following figure, a **unit square** is given. What is the **area of the shaded region**? $\left(\text{Take } \pi = \frac{22}{7}\right)$ (in sq. units)



Options:

1. $\frac{17}{28}$
2. $\frac{19}{28}$

3. $\frac{23}{28}$
4. $\frac{25}{28}$

Correct Answer: Option (1)

Question 132

In triangle ABC, if $\angle A = x^\circ + y^\circ, \angle B = 60^\circ + y^\circ, \angle C = 50^\circ - x^\circ$, then the value of y is:

Options:

1. 45
2. 40
3. 30
4. 35

Correct Answer: Option (4)

Question 133

The largest possible value of $k$such that the distance between the points $(k, 3)$and $(4, k)$is $5$is:

Options:

1. 6
2. 8
3. 7
4. 2

Correct Answer: Option (3)

Question 134

The points $A(-1,3)$, $B(2,-5)$, and $C(4,6)$are given. The equation of the straight line passing through $A$and parallel to $BC$is:

Options:

1. $-22x + 4y + 17 = 0$
2. $11x - 2y + 17 = 0$
3. $-11x + 2y + 17 = 0$
4. $22x - 4y + 35 = 0$

Correct Answer: Option (2)

Question 135

The ratio in which the point $P(5,6)$divides the line joining the points $A(2,3)$and $B(9,10)$internally is:

Options:

1. $4:5$
2. $5:3$
3. $3:5$
4. $3:4$

Correct Answer: Option (4)

Question 136

The equation of the straight line passing through the origin and making an angle of $60°$with the positive direction of the X-axis is:

Options:

1. $x - \sqrt{3}y = 0$
2. $\sqrt{3}x - y = 0$
3. $y = 3x$
4. $x = 3y$

Correct Answer: Option (2)

Question 137

The equation of the straight line passing through the points $O(0,0)$and $A(2,5)$is:

Options:

1. $2x = 5y$
2. $2y = 5x$
3. $3x = 5y$
4. $3y = 5x$

Correct Answer: Option (2)

Question 138

If the Y-intercept made by the line $5x + 3y - k = 0$ is -6, then the value of $k$is:

Options:

1. -18
2. -15
3. -12
4. -21

Correct Answer: Option (1)

Question 139

If $a$and $b$are the X-intercept and Y-intercept respectively of the line $3x + 4y - 12 = 0$, then $a^2 + b^2 =$

Options:

1. 13
2. 26
3. 25
4. 18

Correct Answer: Option (3)

Question 140

The equation of the line passing through the point $P(5, -12)$and making **equal intercepts on both axes** is:

Options:

1. $x - y - 17 = 0$
2. $x + y + 17 = 0$
3. $x + y + 7 = 0$
4. $x + y - 17 = 0$

Correct Answer: Option (3)

SECTION - B: MATHEMATICAL ABILITY

3. Statistical Ability

Question 141

The mean of the first 2000 odd positive integers is

Options:

(1) 2000

(2) 4500

(3) 3000

(4) 2500

Correct Answer: Option (1)

Image 142

Question The arithmetic mean of first 30 terms of an arithmetic progression whose first term is 2 and the common difference 4 is

Options:

(1) 64

(2) 70

(3) 58

(4) 60

Correct Answer: Option (4)

Question 143

If the numbers 5, 7, 6, 14 have frequencies x, x+14, x-3, x+8 respectively and if their arithmetic mean is 10, then **x =**

Options:

(1) 2

(2) 4

(3) 3

(4) 1

Correct Answer: Option (4)

Question 144

Median of the following grouped data is

Class interval	**10 – 20**	**20 – 30**	**30 – 40**	**40 – 50**	**50 – 60**
Frequency	5	10	15	8	2

Options:

(1) 33

(2) 34

(3) 34.3

(4) 33.3

Correct Answer: Option (4)

Question 145

In a data it is observed that the numbers 3, 5, 7, 11, 13, 17 appeared respectively 13, 21, 29, 49, 53, 69 times. Then the median of the data is

Options:

(1) 11

(2) 13

(3) 17

(4) 7

Correct Answer: Option (2)

Question 146

If the mode and median of a data are 10, 8 respectively, then the mean is

Options:

(1) 14

(2) 22

(3) 34

(4) 7

Correct Answer: Option (4)

Question 147

Mode of the observations is 2, 3, 6, 4, 5, 6, 2, 3, 6, 3, 2, 6, 2, 5, 6, 2, 4, 5, 6

Options:

(1) 2

(2) 6

(3) 5

(4) 4

Correct Answer: Option (2)

Question 148

If two dice are rolled at a time, then the probability of getting a **sum of 6** is:

Options:

1. $\frac{7}{36}$
2. $\frac{1}{4}$

3. $\frac{5}{36}$
4. $\frac{1}{12}$

Correct Answer: Option (3)

Question 149

The following data shows the number of children in 15 selected families: $1,2,3,1,4,3,2,1,2,3,4,5,2,1,1$ The probability that a family selected at random has at most 2 children is:

Options:

1. $\frac{7}{15}$
2. $\frac{3}{5}$
3. $\frac{8}{15}$
4. $\frac{11}{15}$

Correct Answer: Option (2)

Question 150

Let $A = \{1,3,5, \ldots, 99\}$. An element x is chosen from A randomly. Then probability that x is a perfect square is:

Options:

1. 0.1
2. 0.12
3. 0.3
4. 0.2

Correct Answer: Option (1)