AP ICET 16th May 2016

Analytical Ability

Instructions [1 - 20]

Following questions, 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 (a) to (d) as per the following guidelines :

1. **What is the positive integer "a" that is not exceeding 1500?**
   I. 19 is a factor of 'a'.
   II. 29 divides 'a'.

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: D

2. **If x and y are positive integers, is x greater than y?**
   I. 20 < x
   II. y > 17

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: D

3. **Is x > y?**
   I. 3x + 2y = 11
   II. x - y = 2

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: B

4. **Is the product xy positive?**
   I. $(x+y)^2 < (x-y)^2$
   II. x = y

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: A

5. **If x, y, z are positive integers, is x + y + z divisible by 7?**
   I. x + y + z is an even number.
   II. x = 4y - 11, z = 2y + 4

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: B

6. **If the product of two positive integers m and n is 132, then whatis the value of m + n?**
   I. m > n
   II. $\mid m-n \mid = 1$

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: B

7. **What is the length of the side BC in the triangle ABC?**
   I. AB = 8cm, AC = 5cm
   II. Area of the triangle ABC is 10 cm^2.

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: D

8. **What is the value of $\cos\theta + \sin\theta$?**
   I. $\sec\theta + \operatorname{cosec}\theta = 5$
   II. $\sin 2\theta = \frac{1}{2}$

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: C

9. **Is the positive integer n divisible by 225?**
   I. 75 is a factor of n.
   II. 45 is a factor of n.

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: C

10. **What percent of marks did Ram get in 4 subjects, on average?**
I. He got 92 in Physics and 85 in English.
II. He got 96 in Mathematics and 94 in Chemistry.

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: D

11. **How old is Raghu today?**
I. Today is his birthday.
II. One year after, he will be twice as old as 10 years ago.

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: B

12. **How much is the loss?**
I. The cost price is ₹ 300.
II. The loss is 25% of the selling price.

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: C

13. **If a is the average of the numbers 1, 2, 3 and x, what is the value of x?**
I. x is an integer.
II. $x = \frac{1}{2}(6a - x)$

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: B

14. **If p% of x is 3, then what is p% of y?**
I. p = 25, x = 12
II. p = 60, y = 50

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: B

15. **A and B'start a business jointly. Whatis A's share out of an annualprofit of ₹ 23,800?**
I. A's investment is ₹ 1,20,000.
II. B's investment is $12\frac{1}{2}\%$ **more than A's investment.**

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: B

16. **If m is an integer and 10 < m < 100, then what is m?**
I. One digit of m is 3 times the other.
II. Sum of the digits in m is 8.

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: D

17. **If x is a positive integer, is the G.C.D. of 300 and x a prime number?**
I. x is a prime number.
II. 5 < x

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: C

18. **If a and b are two distinct two digit numbers that share the same digits, what is the value of a + b?**
I. The difference between the two digits in each number is 7.
II. $\mid a - b \mid = 63$

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: D

19. **Is AB parallel to x-axis?**
I. $OA = \sqrt{11}$
II. B = (2, 3)

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: D

20. **Is the non-negative integer n odd?**
I. $(36)^n$ **is odd.**
II. $(63)^n$ **is odd.**

A if the statement I alone is sufficient to answer the question.

B if the statement II alone is sufficient to answer the question.

C if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.

D if both the statements I and II together are not sufficient to answer the question and additional data is required.

Answer: A

Instructions [21 - 40]

In each of the questions, a sequence of numbers orletters or words orstrings of letters that follow a definite pattern is given. Each question has a blank space. This has to befilled by the correct answer from the four given options to complete the sequence without breaking the pattern.

21. **4 DH : 12 LP :: 6FJ : .....**

A 14 NR

B 14 RN

C 16 NR

D 16 JN

Answer: A

22. **GKXP : DQUV :: FLTR : .....**

A CQXR

B CRQX

C CXQR

D CRXQ

Answer: B

23. **..... : Rain :: Blizzard : Snow**

A Drizzle

B Deluge

C Drift

D Delight

Answer: B

24. **105 : 150 :: 18 : .....**

A 35

B 39

C 45

D 72

Answer: B

25. **Knife : ..... :: Scissors : Cloth**

A Wood

B Paper

C Iron

D Tree

Answer: B

26. **MK : ..... :: JH : 9**

A 11

B 12

C 13

D 10

Answer: B

27. **2 : 12 :: ..... : 56**

A 22

B 30

C 36

D 40

Answer: B

28. **15 : 26 :: 35 : .....**

A 65

B 60

C 56

D 50

Answer: D

29. **U.S.A. : Dollar :: Indonesia : .....**

A Yen

B Poola

C Rupiah

D Birr

Answer: C

30. $\begin{matrix} N \\ W \end{matrix} : \begin{matrix} 41 \\ 32 \end{matrix} :: \begin{matrix} X \\ L \end{matrix} :$ .....

A $\begin{matrix} 24 \\ 21 \end{matrix}$

B $\begin{matrix} 23 \\ 32 \end{matrix}$

C $\begin{matrix} 42 \\ 21 \end{matrix}$

D $\begin{matrix} 42 \\ 12 \end{matrix}$

Answer: C

31. **40, 39, 37, 34, ..., 25**

A 30

B 31

C 32

D 33

Answer: A

32. **841, 529, ..., 289**

A 441

B 361

C 429

D 489

Answer: B

33. **1, 2, 6, 15, ..., 56**

A 31

B 32

C 34

D 35

Answer: A

34. **2A2, 4D3, 12G5, ...**

A 24I7

B 36J7

C 48J7

D 48K9

Answer: C

35. **24, 60, 120, 210, ...**

A 312

B 326

C 336

D 343

Answer: C

36. **5, 15, 35, 65, ...**

A 105

B 95

C 85

D 75

Answer: A

37. **ACF, CFJ, EIN, ...**

A GLQ

B GKR

C GLR

D EKQ

Answer: C

38. **13, 25, 51, 101, 203, ...**

A 407

B 406

C 405

D 401

Answer: C

39. **0, 3, 8, 15, 24, ..., 48**

A 41

B 37

C 35

D 29

Answer: C

40. **225, 336, 447, ..., 669**

A 556

B 558

C 554

D 555

Answer: B

Instructions [41 - 45]

In the following questions pick the odd thing out :

41.

A (4, 6, 12)

B (4, 10, 20)

C (6, 8, 24)

D (8, 12, 48)

Answer: B

42.

A 83

B 73

C 63

D 53

Answer: C

43.

A but

B hut

C nut

D put

Answer: D

44.

A 134

B 156

C 246

D 364

Answer: D

45.

A Oxygen

B Helium

C Neon

D Xenon

Answer: A

Instructions [46 - 50]

In a Hostel with 500 students, 238 read Newspaper A, 217 read Newspaper B, 206 read Newspaper C, 90 read Papers A and B, 70 read Papers B and C, 83 read Papers C and A, 27 read all the three Newspapers A, B and C. Based on this information, answer the following questions.

46. **The number of students in the hostel who do not read any of the papers A, B and C is**

A 54

B 55

C 56

D 45

Answer: B

47. **The number of students in the hostel who read only one paper among A, B and C is**

A 246

B 265

C 256

D 156

Answer: C

48. **The number of students in the hostel who read exactly two Newspapers in A, B and C is**

A 189

B 243

C 216

D 162

Answer: D

49. **The number of students in the hostel who read Newspaper A only is**

A 92

B 105

C 148

D 211

Answer: A

50. **The number of students in the hostel who read Newspapers A and C but not paper is**

A 83

B 56

C 70

D 63

Answer: B

Instructions [51 - 55]

The table given below shows the production of four types of Cars A, B, C and D in the years 2010 to 2015. Based on the information given in the table answer questions

Year → / Type ↓	2010	2011	2012	2013	2014	2015
A	282	316	402	415	494	512
B	314	362	415	467	489	543
C	265	312	387	433	502	528
D	343	385	402	434	467	504

51. **In the year 2013, which type of car had registered the highest percent of increase in production over its previous year?**

A A

B C

C B

D D

Answer: C

52. **In which year, did car of type B register the highest percent of growth in production over its previous year?**

A 2015

B 2013

C 2012

D 2011

Answer: D

53. **In the year 2014, what was the percentage growth ofall types of cars put together over its previous year, correct to two decimals?**

A 11.61

B 12.03

C 12.30

D 11.21

Answer: A

54. **During the period 2010-2015, which type of car registered the production of the highest number of cars?**

A A

B B

C C

D D

Answer: B

55. **The growth percent of the D type cars in the year 2013 over the year 2010, correct to two decimals, is**

A 27.65

B 27.52

C 26.53

D 24.94

Answer: C

Instructions [56 - 60]

The letters of the English alphabet are arranged around circle in clock-wise direction and are coded as follows :
A Vowel is coded as the next Vowelin the clockwise direction. A Consonant is coded as the next Consonantin the anti-clockwise direction.
For decoding, the reverse process is adopted. Using this coding and decoding process, answer the following questions

56. **The code word for 'NATURAL' is**

A MESAQFM

B MESAQEK

C MESIQDK

D MESASEK

Answer: B

57. **The code word for PEACE is**

A NIEBI

B NIEDI

C NAEBA

D NIUBI

Answer: A

58. **The code word for 'UNITY' is**

A AMOSY

B AMOTX

C AMOSX

D AMESX

Answer: C

59. **The word that is coded as SQASG is**

A TRUCK

B TRUNK

C TREAT

D TRUTH

Answer: D

60. **The code word for FORTUNATE is**

A DUQSAMBSA

B DUQSALESA

C DUQSAMESI

D DUQUAMESI

Answer: C

Instructions [61 - 65]

The letters of the English alphabet are coded as follows:
For $1 \leq n \leq 26$, the n^{th} letter is coded as the r^{th} letter where r is the remainder obtained when 7n + 5 is divided by $26 (1 \leq r \leq 26)$. For decoding the reverse process is followed. Using this coding and decoding process, answer the questions.

61. **The code for the word 'ANSWER' is**

A LTHIMC

B LYHJNA

C LYKMOD

D LTKJNE

Answer: B

62. **The code for the string PIXLY is**

A MPQKX

B MPNOY

C MTOKZ

D MCQPY

Answer: A

63. **The number of letters that remain unchanged after coding is**

A 3

B 2

C 1

D 0

Answer: D

64. **The string of letters that is coded as TIGER is**

A OPBNA

B QHDZM

C PIEYL

D RTDPC

Answer: B

65. **The string of letters that is coded as MYSON is**

A PJDRQ

B SJBTR

C PNBTE

D SNDRT

Answer: C

66. **Five bags A, B, C, D and E are piled one abovethe other. If A is above B, C is above D but below E, and D is above A, then which bagis in the middle?**

A A

B B

C C

D D

Answer: D

67. **The angle between the minutes hand and the seconds hand when it is 3 hr. 26 min. 25 sec. in a clock is**

A 9.5°

B 9°

C 8.5°

D 8°

Answer: C

68. **The number of seconds in $\frac{11}{18}$ of an hour is**

A 2100

B 2200

C 2000

D 2300

Answer: B

69. **How many times do the hours hand and minutes hand of a clock overlap between 1 AM and 11 PM?**

A 24

B 23

C 22

D 21

Answer: D

70. **A is the brother of B, B is the daughter of C, and D is the father of A. How is C related to D ?**

A Grand-daughter

B Husband

C Daughter

D Wife

Answer: D

71. **P and Q decided to meet at a venue at the scheduled time. After his arrival at 5.15 PM, P found that he came 50 minutes earlier than Q, who came 35 minutes late to the meeting. What is the scheduled time of the meeting?**

A 5.30 AM

B 5.45 PM

C 5.30 PM

D 5.25 PM

Answer: C

72. **If** $a * b = \overset{a^2+b^2}{ab}$ **, then** $(1 * 2) * 3 =$

A $\overset{21}{30}$

B $\overset{61}{30}$

C $\overset{61}{15}$

D $\overset{61}{3}$

Answer: B

73. **If D denotes division, M denotes multiplication, A denotes addition, and S denotes subtraction, then 4A3S12M16D4 =**

A -41

B 42

C 41

D -42

Answer: A

74. $1 + \overset{1}{5} + \overset{1}{25} + \overset{1}{125} + \overset{1}{625} + ...\infty =$

A $\overset{3}{2}$

B $\overset{5}{4}$

C $\overset{6}{5}$

D 2

Answer: B

75. $\{m \epsilon Z :\mid 2 - m \mid < 4\} =$

A $\{-1, 0, 1, 2, 3, 4, 5, 6\}$

B $\{-3, -2, -1, 0, 1, 2, 3\}$

C $\{-2, -1, 0, 1, 2, 3, 4\}$

D $\{-1, 0, 1, 2, 3, 4, 5\}$

Answer: D

Mathematical Ability

76. **If x(≠0) ϵR, then** $\frac{1}{1+x+x^2} + \frac{1}{1+x+x^{-1}} + \frac{1}{1+x^{-1}+x^{-2}} =$

A x^3

B $x^{\frac{1}{3}}$

C x^0

D 0

Answer: C

Explanation:
Retain the first term as it is.

Multiply the numerator and denominator of the second term by x.
it gets transformed to $\frac{x}{x+x^2+1}$

Multiply the numerator and denominator of the third term by x*x
It gets transformed to $\frac{x^2}{x+x^2+1}$

As can be seen, the denominators of all three terms are equal.
The numerators can all be added up directly now. It is seen that numerator and denominator are equal now.
Hence, answer = 1 i.e. option C

77. **If** $2^{2n-1} = \frac{1}{8^{n-3}}$**, then** $2^{n-2} =$

A 2

B 1

C 4

D 8

Answer: B

Explanation:
Given, $2^{2n-1} = \frac{1}{8^{n-3}}$

$\Rightarrow 2^{2n-1} = \frac{1}{2^{3(n-3)}}$

$\Rightarrow 2^{2n-1} = 2^{-3(n-3)}$

As bases are equal, equating powers

$2n-1=-3\left(n-3\right)$

$\Rightarrow\ 2n-1=-3n+9$

$\Rightarrow\ 5n=10$

$\Rightarrow\ n=2$

$\therefore\ 2^{n-2}=2^{2-2}=2^0=1$

78. **If** $a+b+c=0$**, then** $\frac{1}{x^a+x^{-b}+1}+\frac{1}{x^b+x^{-c}+1}+\frac{1}{x^c+x^{-a}+1}=$

A x^{a+b+c}

B x^{abc}

C 1

D 0

Answer: C

79. **If** $a+b=7,b+c=-3,c+a=-4$**, then** $a^3+b^3+c^3=$

A 252

B -252

C 0

D 343

Answer: B

Explanation:
Given,

$a+b=7$ .....(1)

$b+c=-3$ .....(2)

$c+a=-4$ .....(3)

Adding (1), (2) and (3), we get

$2a+2b+2c=0$

$\Rightarrow\ a+b+c=0$ .....(4)

From (1) and (4), $\ c=-7$

From (2) and (4), $a=3$

From (3) and (4), $b=4$

$\therefore\ a^3+b^3+c^3=3^3+4^3+\left(-7\right)^3=27+64-343=-252$

80. **If** $\frac{2+\sqrt{3}}{2-\sqrt{3}} + \frac{2-\sqrt{3}}{2+\sqrt{3}} + \frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$**, then** $a + 4b =$

A 17

B 20

C 15

D 12

Answer: D

Explanation:

Multiplying both numerator and denominator of first term by $\left(2+\sqrt{3}\right)$, the term changes to $\left(2+\sqrt{3}\right)^2$

Multiplying both numerator and denominator of second term by $\left(2-\sqrt{3}\right)$, the term changes to $\left(2-\sqrt{3}\right)^2$

Multiplying both numerator and denominator of third term by $\left(\sqrt{3}-1\right)$, the term changes to $\frac{\left(\sqrt{3}-1\right)^2}{2}$

Opening up the squares and adding up the terms, we get $16-\sqrt{3}$, hence, a = 16, b = -1

Hence, a+4b becomes 12

81. $\sqrt{30-12\sqrt{6}} =$

A $\sqrt{12}-\sqrt{8}$

B $2\sqrt{3}-3\sqrt{2}$

C $3\sqrt{2}-2\sqrt{3}$

D $\sqrt{8}-2\sqrt{3}$

Answer: C

Explanation:

Different approaches are possible for this question.

One of the ways can be to take the square of any option and it should result in the term which is enclosed in the square root sign in the question.

Another approach would be to split the terms of the square root to make it a perfect square.

$30-12\sqrt{6} = 30-2\cdot 6\cdot \sqrt{3}\sqrt{2} = 30-2\cdot 3\cdot 2\cdot \sqrt{3}\sqrt{2}$

It means 30 could be the sum of squares of one of the following possible combinations: $3\sqrt{3}$ & $2\sqrt{2}$ OR $3\sqrt{2}$ & $2\sqrt{3}$

We can see that it is the sum of the squares of the second combination.

Hence, $30 - 12\sqrt{6}$ = $\left(3\sqrt{2} - 2\sqrt{3}\right)^2$

82. **If a : b = 5 : 8, then (4a + 5b) : (5a + 4b) =**

A 60 : 59

B 59 : 60

C 60 : 57

D 57 : 60

Answer: C

Explanation:

Let a = 5x and b = 8x

4a + 5b = 20x + 40x = 60x

5a + 4b = 25x + 32x = 57x

∴ (4a + 5b) : (5a + 4b) = 60x : 57x = 60 : 57

83. **If n is the largest positive integer such that 7^n divides $(68)!$, then n =**

A 5

B 10

C 15

D 20

Answer: B

Explanation:

The largest power of 7 that divides $(68)!$ = Sum of the quotients of $\{\frac{68}{7}, \frac{68}{7^2}, \frac{68}{7^3}, ...\}$

= Sum of the quotients of $\{\frac{68}{7}, \frac{68}{49}, \frac{68}{343}, ...\}$

= 9 + 1 + 0 + 0 + ...

= 10

∴ n = 10

Hence, the correct answer is Option B

84. **The binary equivalent of the number 199 is**

A 1100111

B 11100111

C 11000111

D 11100011

Answer: C

Explanation:

Divisor	Quotient	Remainder
2	199	1
2	99	1
2	49	1
2	24	0
2	12	0
2	6	0
2	3	1
	1	

∴ The binary equivalent of the number 199 is 11000111

Hence, the correct answer is Option C

85. **If** $0 \leq x < 19$ **and** $14x \equiv 6(mod\ 19)$**, then** $x =$

A 3

B 8

C 14

D 18

Answer: C

Explanation:
We are given that the product of 14 and x i.e. 14x when divided by 19, should give a remainder 6.
One can simply take the different available values of x from the options, multiply it by 14 and then divide by 19 to see whether remainder obtained is 6.

This happens when x = 14 as 14*14 = 196 which when divided by 19 gives us remainder 6.

86. **If** $a = \frac{\sqrt{5}+1}{\sqrt{5}-1}$ **and** $b = \frac{\sqrt{5}-1}{\sqrt{5}+1}$**, then the value of** $a^2 + ab + b^2$ **is**

A 8

B 9

C 7

D 6

Answer: A

Explanation:

Multiplying both numerator and denominator of a by $\sqrt{5}$, we get a = $\frac{\left(\sqrt{5}+1\right)^2}{4}$

Multiplying both numerator and denominator of b by $\sqrt{5}-1$, we get b = $\frac{\left(\sqrt{5}-1\right)^2}{4}$

Now, $a^2 = \frac{\left(14+6\sqrt{5}\right)}{4}$
$b^2 = \frac{\left(14-6\sqrt{5}\right)}{4}$
$a \cdot b = 1$

Adding them up, we get 8 as the answer

87. **The largest power of 3 that divides $(20)!$ is**

A 3^5

B 3^6

C 3^7

D 3^8

Answer: D

Explanation:

The largest power of 3 that divides $(20)!$ = Sum of quotients of $\{\frac{20}{3}, \frac{20}{3^2}, \frac{20}{3^3}, ...\}$

= Sum of quotients of $\frac{20}{3}, \frac{20}{9}, \frac{20}{27}, ...$

= 6 + 2 + 0 + 0 +.....

= 8

$\therefore$ The largest power of 3 that divides $(20)!$ is 3^8

Hence, the correct answer is Option D

88. **The number among the following which is not a multiple of 33 is**

A 112233

B 121233

C 221133

D 332211

Answer: B

Explanation:
For a number to be divisible by 33, it must be divisible by both 11 and 3
We can see that all options would be divisible by 3.

However, the number in option B is not divisible by 11 after applying divisibility test of 11 to all the options.

89. **The descending order of the numbers $5\sqrt{6}, 10\sqrt{3}, 7\sqrt{5}, 6\sqrt{7}$ is**

A $6\sqrt{7}, 7\sqrt{5}, 10\sqrt{3}, 5\sqrt{6}$

B $10\sqrt{3}, 6\sqrt{7}, 7\sqrt{5}, 5\sqrt{6}$

C $5\sqrt{6}, 7\sqrt{5}, 6\sqrt{7}, 10\sqrt{3}$

D $10\sqrt{3}, 7\sqrt{5}, 6\sqrt{7}, 5\sqrt{6}$

Answer: B

Explanation:
This question can be resolved by knowing approximate values of the square roots of 3, 5, 7.
Sqrt(3) = 1.73 approx., sqrt(5) = 2.23 approx., sqrt(7) = 2.6 approx.

Now, we can see that $10\sqrt{3}$ will be larger than 17 while $7\sqrt{5}$ would be a little over 15.
While in contrast, $5\sqrt{6}$ would not even be 15.
Also, $6\sqrt{7}$ would be greater than 15.

Hence, we can say that $10\sqrt{3}$ is the largest of them all and $5\sqrt{6}$ would be the smallest.
$6\sqrt{7} > 7\sqrt{5}$.
Hence, answer is B

90. **Out of a total of 750 students each student studies at least one of the two subjects, Physics and Mathematics. If 40% of them study Mathematics and 70% study Physics, then the number of students who study both is**

A 65

B 75

C 85

D 95

Answer: B

Explanation:
Students who study Physics = 70% of 750 = 525 ... (A)
Students who study Mathematics = 40% of 750 = 300 ... (B)

Total students = (A) + (B) - (Students who study both)
750 = 825 - (Students who study both)
Students studying both subjects = 75

91. **If both the radius and height of a cylinder increase by 10%, then its volume increases by**

A 33.1%

B 33.2%

C 33.3%

D 33.4%

Answer: A

Explanation:
Original Volume V = $\pi \cdot r^2 \cdot h$

New Volume = $\pi \cdot (1.1r)^2 \cdot (1.1)\, h = 1.331 \cdot \pi \cdot (r)^2 \cdot h = 1.331V$

Hence, the volume increases by 33.1%

92. **What percent on the cost price of an article should a business man mark onhis article so that he allows a discount of 30% on it and minimizes his loss to 2%?**

A 30

B 35

C 40

D 45

Answer: C

Explanation:
Let the marked price be MP. After giving a discount of 30% on it, loss incurred is 2%
hence, we can say that 0.7MP = 0.98CP
Thus MP = (0.98/0.7)CP = 1.4*CP

Hence, marked price must be 40% above the cost price of the article

93. **The selling price of an article is ₹ 75. If the profit percent is equal to its cost price, then the cost price ofthat article (in ₹) is**

A 50

B 55

C 60

D 65

Answer: A

Explanation:
Let cost price be CP

$$CP\left(1+\frac{CP}{100}\right)=SP=75$$

$$100CP+CP^2=7500$$

This gives CP = -150 or CP = 50

94. **Two persons P and Q enter into a business with the investments ₹ 90,000 and 1,25,000 respectively. After 9 months Q withdraws his money from the business. If ₹ 32,340 is the profit at the end of the year, then the share ofP (in ₹) is**

A 7,920

B 15,640

C 15,840

D 15,940

Answer: C

Explanation:
Investment*Time product of P = 90,000*12 = 10,80,000 rupees-months
Investment*Time product of Q = 1,25,000*9 = 11,25,000 rupees-months

Total = 22,05,000 rupees-months

Share of P in the year-end profit = (1080/2205)*32,340 = 15,840 rupees

95. **Three persons A, B and start a business with the investments in the ratio 3 : 4 : 5. After 3 months B invests an additional amount of 1/4th of his capital and C withdrew 1/5th of his capital. Ifthe annual profit in the business is ₹ 2,40,000, then B's share in the profit (in 2) is**

A 90,000

B 91,000

C 93,000

D 95,000

Answer: D

Explanation:
The year end profits are shared in the ratio made by the individual's sum total of (investment*time period) product for all the 12 months.
Let the individual investments made by A,B,C be 3x, 4x, 5x respectively.

A's investment remains unchanged for all 12 months.
Hence, his Investment*Time product = 36x units

B's investment is 4x for 3 months and then 5x for 9 months
Hence, his Investment*Time product = 12x + 45x = 57x units

C's investment is 5x for 3 months and 4x for 9 months
Hence, his Investment*Time product = 51x units

Total of Investment*Time products = 144x units

Hence, share of B in annual profit of 2,40,000 = (57/144)*2,40,000 = 95,000

96. **If** $a : b = 2 : 5$**, then** $a^2 - ab + b^2 : a^2 + ab + b^2 =$

A 19 : 39

B 6 : 13

C 17 : 39

D 13 : 39

Answer: A

Explanation:
Given, a : b = 2 : 5

Let a = 2k and b = 5k

$a^2 - ab + b^2 = (2k)^2 - (2k)(5k) + (5k)^2 = 4k^2 - 10k^2 + 25k^2 = 19k^2$

$a^2 + ab + b^2 = (2k)^2 + (2k)(5k) + (5k)^2 = 4k^2 + 10k^2 + 25k^2 = 39k^2$

$\therefore\ a^2 - ab + b^2 : a^2 + ab + b^2 = 19k^2 : 39k^2 = 19 : 39$

Hence, the correct answer is Option A

97. **Two water pipes A and B can fill an empty tank in 8 and 12 hrs. respectively and tap at, the bottom of the tank can empty the full tank in 9 hrs. If tap C is opened two hours after the pipes A and B are opened, then the total time (in hrs.) taken to fill the tank is**

A 5

B 7

C 6

D 8

Answer: D

Explanation:
Let the capacity of the tank be 72 liters
Hence, A = 9 liters/hour, B = 6 liters/hour, C = -8 liters/hour.

Now, tank filled by A and B in the first 2 hours = 30 liters.
Tank capacity remaining = 42 liters
After this C is opened, net filling capacity drops to 7 liters/hour
Hence, the time taken to fill remaining tank = 42/7 = 6 hours
Hence, total time taken = 2+6 = 8 hours

98. **A pumpcan fill an empty tank in 3 hours. Because of a leakage at the bottom ofthe tank, it took half an hour extra time. The time taken (in hours) to drain all the water from the full tank by the leakage is**

A 20

B 21

C 22

D 23

Answer: B

Explanation:
Let the capacity of the tank be 210 liters.
Hence, the capacity of the pump = 70 liters/hour

But because of the leak, it takes 3.5 hours.
Hence, effective filling rate of the tank with the pump and the leak = 210/3.5 = 60 liters/hour

Hence, the leak is occurring at the rate of 10 liters/hour.
Hence, time taken by the leak to drain a full tank = 210/10 = 21 hours.

99. **Three persons A, B and C together complete a work in 3 days; B and C together complete the work in 6 days; and A and C together complete the same work in $4\frac{1}{2}$ days. Then the number of days in which C alone can complete the work is**

A 24

B 12

C 15

D 18

Answer: D

Explanation:
Let the total work be 18 units and the capacities of A,B,C be a,b,c units/day respectively.
Hence, a+b+c = 6 and b+c = 3 ==> a = 3 units/day
Also, a + c = 4 hence, c = 1 unit/day.
Hence, time required by C alone to complete all the work = 18 days

100. **A person A can turnout thrice as much work as B can do. B alone can complete that work in 20 days. After both of them worked together for 4 days, A left the work and B continued till the end. Then the time (in days) taken by B to complete the remaining work after A left the job, is**

A 4

B 5

C 6

D 7

Answer: A

Explanation:
Let the total work be 60 units.
Hence, capacity of B = 3 units/day and thus, capacity of A = 9 units/day
A and B work together for 4 days, hence, work completed = 48 units
Remaining work = 12 units completed by B in 12/3 = 4 days

101. **A person A having completed 60% of the work in 15 days, calls another person B and they together finish the remaining work in 5 days. Then how many days B alone would have taken to do the whole work?**

A 25

B 20

C $37\frac{1}{2}$

D 37

Answer: A

Explanation:
If A completes 60% of work in 15 days alone, then he can do entire work alone in 25 days.
Now, it is given that A and B complete 40% of work together in 5 days.
Hence, A and B together can do entire work in 100/8 i.e. 12.5 days

Now, let B be able to do entire work alone in x days
Hence, going by the standard formula:
$\frac{100}{8} = \frac{25x}{25+x}$ ==> x = 25 days

102. **A train crosses an electric pole in 15 seconds, and a platform of length 100 metres in 25 seconds. Then the length ofthe train (in metres) is**

A 120

B 150

C 180

D 200

Answer: B

Explanation:
Let the length of the train be L meters and its speed be S m/s

By given info, we can say that:
L = 15*S and L+100 = 25*S
Solving both equations we get L = 150 meters

103. **A train travels at an average speed of 70 kmph and covers a distance of 140 km. The train travels the first 80 km at a speed of 60 kmph. Then the speed (in kmph) during the next 60 km is**

A 70

B 80

C 90

D 100

Answer: C

Explanation:
Time for which train was travelling = 140/70 = 2 hours

Time for which the train needed to cover 80 km = 80/60 = 4/3 hours
Hence, remaining time = 2 - (4/3) = 2/3 hour
Speed for the remaining 60 km = 60/(2/3) = 90 kmph

104. **A sector area ofa circle of radius 14 om is $\frac{154}{3} cm^2$. Then the angle of the sector (in radious) is**

A $\frac{\pi}{3}$

B $\frac{\pi}{6}$

C $\frac{\pi}{4}$

D $\frac{\pi}{12}$

Answer: B

Explanation:
The angle subtended by the sector is directly proportional to the area it commands.
Hence, we can write

$$\frac{2\pi}{\frac{22}{7}\cdot 14\cdot 14} = \frac{?}{\frac{154}{3}}$$

This gives us the ? value = Pi/6

105. **If the measures of the angles of a triangle are in the ratio 1 : 2 : 3 and if the length of the smallest side of the triangle is 10 cm, then the length of the fa side (in cm) is**

A $10\sqrt{3}$

B $20\sqrt{3}$

C 20

D 30

Answer: C

Explanation:
Let the angles be x, 2x, 3x
x+2x+3x =180 ++> x = 30 degrees

Hence, it is a 30-60-90 triangle.
The length of the smallest side i.e. the length of the side opposite the 30 degree angle = 10 cm
Hence, the largest side = Hypotenuse = 2*10 = 20 cm

106. **A cylindrical container of radius 6 cm and height 15 cm is filled with ice-cream. The entire ice-cream is divided equally among 10 children in the shape of cones surmounted by hemispherical tops. If the height of the conical ice-cream bow! is twice the diameter of its base, then the base radius of the cone is**

A 5 cm

B 4 cm

C 3 cm

D 2 cm

Answer: C

Explanation:

Volume of ice cream in each cone = $\frac{1}{10} \cdot \frac{22}{7} \cdot 36 \cdot 15 = \frac{33 \cdot 36}{7}$

The ice cream is filled in the cone plus a surplus hemispherical lobe at top of it.

Hence,

$\frac{33 \cdot 36}{7} = \frac{1}{3} \cdot \frac{22}{7} \cdot r^2 \cdot 4r + \frac{2}{3} \cdot \frac{22}{7} \cdot r^3$

Solving this, we easily get r = 3

107. **A circus tent is in the form of a cylinder surmounted by a cone. The radius of the base of the cylinder is 30 feet and its height is 10 feet. If the total height of the tent is 20 feet, then the volume of the air (in cubic feet) in the tent is**

A $120\ \pi$

B $1200\ \pi$

C $12000\ \pi$

D $140\ \pi$

Answer: C

Explanation:

Given, the circus tent is in the form of a cylinder surmounted by a cone.

The circus is in the shape of cone placed over cylinder. Radius of both will be equal.

Radius of the cylinder = 30 feet

$\Rightarrow$ Radius of the cone = 30 feet

Height of the cylinder = 10 feet

Total height of the tent = 20 feet

$\Rightarrow$ Height of the cone = 20 - 10 = 10 feet

$\therefore$ Volume of the tent = Volume of the cylinder + Volume of the cone

$= \pi\ (30)^2 (10) + \frac{1}{3}\pi (30)^2 (10)$

$= \frac{4}{3}\pi (30)^2 (10)$

$= \frac{4}{3}\pi \times 9000$

$= 12000\pi$ cubic feet

Hence, the correct answer is Option C

108. **If $a = x^{b-c}, b = x^{c-a}, c = x^{a-b}$, then $a^a.b^b.c^c =$**

A abc

B 1

C $\log(abc)$

D 0

Answer: B

Explanation:
Given,

$a = x^{b-c}$

$\Rightarrow a^a = x^{ab-ac}$ .....(1)

$b = x^{c-a}$

$\Rightarrow b^b = x^{bc-ba}$ .....(2)

$c = x^{a-b}$

$\Rightarrow c^c = x^{ca-cb}$ .....(3)

Now multiplying the equations (1), (2), (3)

$a^a\ b^b\ c^c = x^{ab-ac+bc-ba+ca-cb} = x^0 = 1$

Hence, the correct answer is Option B

109. **A three digit number 4a3 is added to another three digit number 984 to give the four digit number 13b7 which is divisible by 11. Then** $(a+b)^2 =$

A 10

B 25

C 64

D 100

Answer: D

Explanation:
Now 13b7 is divisible by 11. Hence (b+1)-10 =11m (divisibility rule for 11)

As we can see, this is only possible when m=0 (do remember that "b" has to be a single-digit)

Hence b+1-10 or b=9 Hence the number is 1397. Subtracting 984 from it we get 413. Hence a=1

So (a+b)^2=100

110. **If** $x = \sqrt{5+\sqrt{5+\sqrt{5+.....}}}$ **, then which of the following is true?**

A $3 < x < 4$

B $2 < x < \frac{5}{2}$

C $\frac{5}{2} < x < 3$

D $x > \frac{7}{2}$

Answer: C

111. **If a set A has 7 elements, then the number of subsets of A with at most 5 elements is**

A 63

B 120

C 80

D 96

Answer: B

Explanation:
We have to find subsets with atmost 5 elements. Hence from all the possible subsets, subtracts all those subsets having 6 and 7 elements.

$2^7 - {}^7C\,6 - {}^7C\,7 = 128 - 8 = 120$

112. **The statement $p \to (q \to r)$ is equivalent to**

A $p \to (q \vee r)$

B $(p \wedge q) \to r$

C $(p \vee q) \to r$

D $p \to (q \wedge r)$

Answer: B

113. **The statement $(p \wedge q) \vee ((\sim p) \wedge q)$ is equivalent to**

A p

B $\sim p$

C q

D $\sim q$

Answer: C

114. **If A is a set such that n(A) = 5, then the number of symmetric relations that can be defined on A is**

A 2^5

B 2^{10}

C 2^{15}

D 2^{20}

Answer: C

115. **The function $f : R \rightarrow R$ defined by $f(x) = 3x^2 + 5$, for all $x \epsilon R$, is**

A one-one only

B onto only

C a bijection

D neither one-one nor onto

Answer: D

116. **If A. B are two sets such that n(A) = 5, n(B) = 6, then the number of surjections that can be defined from A to B is**

A $5^6 - 5$

B $6^5 - 6$

C 30

D 0

Answer: D

117. **The equation of the straight line passing through the point (7, -5) with slope $\frac{-4}{5}$ is**

A 4x - 5y - 53 = 0

B 4x + 5y - 3 = 0

C 5x + 4y - 15 = 0

D 5x - 4y - 55 = 0

Answer: B

Explanation:

Equation of the straight line passing through the point (7, -5) with slope $\frac{-4}{5}$ is $(y+5) = -\frac{4}{5}(x-7)$

$5y + 25 = -4x + 28$

$5y + 4x = 3$

$4x + 5y - 3 = 0$

Hence, the correct answer is Option B

118. **If a line makes intercepts 5, 12 on X, Y axes respectively, then the length of the perpendicular drawn from the origin to the line is**

A $\frac{60}{13}$

B $\frac{12}{13}$

C $\frac{13}{60}$

D $\frac{13}{12}$

Answer: A

Explanation:

Equation of the line having 5 and 12 as intercepts is $\frac{x}{5} + \frac{y}{12} = 1 \; or \; 12x + 5y - 60 = 0$

Perpendicular distance from (0,0) is $\frac{|12(0)+5(0)-60|}{\sqrt{12^2+5^2}} = \frac{60}{13}$

119. $\tan 20^\circ \; \tan 40^\circ \; \tan 60^\circ \; \tan 80^\circ =$

A 3

B $\frac{3}{4}$

C $\frac{\sqrt{3}}{16}$

D $\frac{\sqrt{3}}{4}$

Answer: A

120. **The value of** $\cot(1950^\circ)$ **is**

A $\sqrt{3}$

B $-\sqrt{3}$

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

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

Answer: B

Explanation:

$\cot(1950^\circ) = \cot(5(360^\circ) + 150^\circ)$

$= \cot 150^\circ$

$= \cot(180^\circ - 30^\circ)$

$= -\cot 30^\circ$

$= -\sqrt{3}$

Hence, the correct answer is Option B

121. $(1 + \tan 95^\circ)(1 + \tan 130^\circ) =$

A -2

B $3 + 2\sqrt{3}$

C $3 - 2\sqrt{3}$

D 2

Answer: D

122. **If** $0 < \theta < \frac{\pi}{2}$ **and** $\tan\theta + \sec\theta = 3$**, then** $\sin\theta =$

A $\frac{1}{2}$

B $\frac{4}{5}$

C $\frac{1}{5}$

D $\frac{\sqrt{3}}{2}$

Answer: B

Explanation:

We have $\tan\theta + \sec\theta = 3$

$\frac{\sin\theta}{\cos\theta} + \frac{1}{\cos\theta} = 3$ *or* $1 + \sin\theta = 3\cos\theta$

Squaring both sides

$1 + \sin^2\theta + 2\sin\theta = 9\cos^2\theta$

$1 + \sin^2\theta + 2\sin\theta = 9 - 9\sin^2\theta$

$10\sin^2\theta + 2\sin\theta - 8 = 0$ *or* $5\ \sin^2\theta + \sin\theta - 4 = 0$

$5\ \sin^2\theta + 5\sin\theta - 4\sin\theta - 4 = 0$

$5\sin\theta\ (\sin\theta + 1) - 4\,(\sin\theta + 1) = 0$

$(5\sin\theta - 4)\,(\sin\theta + 1) = 0$

$0 < \theta < \pi\ \ so\ \sin\theta \neq -1$

Hence $\sin\theta = {}^{4}_{5}$

123. **The angles of elevation of the top of a building measured from two points A, B on the horizontal ground and on the sameside of the building are respectively $30^\circ, 60^\circ$. If A, B and the foot of the building are collinear and AB = 400 metres, then the height of that building, in metres, is**

A $200\sqrt{3}$

B 200

C $100(\sqrt{3} - 1)$

D $100(\sqrt{3} + 1)$

Answer: A

124. **When the polynomial $7x^3 - 3x^2 + ax - 5$ is divided by $x + 3$, the remainder is -13. Then a =**

A ${}^{308}_{3}$

B ${}^{208}_{3}$

C ${}^{-308}_{3}$

D ${}^{-208}_{3}$

Answer: D

Explanation:

$Let\ f\,(x) = 7x^3 - 3x^2 + ax - 5$ Now according to remainder theorem, x+3=0 or x=-3 . Hence f(-3)=-13

-189-27-3a-5=-13 or -3a=308 or a=-308/3

125. **The relation R is defined on the set of all real numbers by R = {(a, b) $\in$ R $\times$ R/a - b is an integer}. Then R is**

A reflexive, symmetric but not transitive.

B symmetric, transitive but not reflexive.

C reflexive, transitive but not symmetric.

D an equivalence relation.

Answer: D

126. **The sum of all the 3 digit numbers which leave the remainder 1 when divided by 4 is**

A 124575

B 123475

C 123525

D 124475

Answer: C

Explanation:
The First 3 digit number, which leaves a remainder of 1 when divided by 4 is 101 and the last is 997.

Total number of terms is 225. Hence applying the formula of AP and finding the sum

$\frac{225}{2}(997+101) = \frac{1098}{2} \times 225 = 123525$

127. **If $x+y+z=0$ and $xyz=5$, then $x^3+y^3+z^3=$**

A 5

B 15

C 25

D 35

Answer: B

Explanation:
Given, $x+y+z=0$ and $xyz=5$

When $x+y+z=0$, then $x^3+y^3+z^3=3xyz$

$\Rightarrow x^3+y^3+z^3=3(5)$

$\Rightarrow x^3+y^3+z^3=15$

Hence, the correct answer is Option B

128. **In an arithmetic progression the ratio of 15^{th} term to 7^{th} term is 11 : 9. Then the ratio of 12^{th} term to 8^{th} term is**

A 23:19

B 41:37

C 19:23

D 37:41

Answer: B

129. **The value of the term independent of x in the expansion of** $\left(3x - \frac{4}{x^2}\right)^9$ **is**

A $7 \times 3^7 \times 2^8$

B $7 \times 3^8 \times 2^7$

C $-7 \times 3^7 \times 2^8$

D $-7 \times 3^8 \times 2^7$

Answer: C

130. **If** $C_r =^{10} C_r$**, then the value of** $C_0 + 3.C_1 + 5.C_2 + ... + 21.C_{10} =$

A 2^{10}

B $9(2^{10})$

C $11(2^{10})$

D 2^9

Answer: C

131. **The sum to infinite terms of the progression** $6, 4\frac{4}{5}, 3\frac{21}{25}, ...$ **is**

A 11

B 33

C 60

D 30

Answer: D

132. **If A is an** $n \times n$ **matrix such that** $A^2 = I$ **and** $A \neq A^2$**, then det(I + A) =**

A 0

B 1

C -1

D 2

Answer: A

133. **If $A = (a_{ij})$ is a 3×3 matrix and $a_{ij} = 4i + 7j$ for $1 \leq i, j \leq 3$, then trace of 3A =**

A 33

B 198

C 66

D 594

Answer: B

134. $\lim_{x \to 0} \frac{\tan^3 3x}{5x^3} =$

A $\frac{27}{5}$

B $\frac{9}{5}$

C $\frac{3}{5}$

D $\frac{27}{125}$

Answer: A

135. $\lim_{x \to 0} \frac{e^{3x} - e^{4x}}{\sin 3x \cos 4x} =$

A $\frac{1}{3}$

B $\frac{-1}{3}$

C 3

D does not exis

Answer: B

136. **If $x = \sin\theta + \theta\cos\theta$ and $y = \cos\theta + \theta\sin\theta$, then $\frac{dy}{dx}$ at $\theta = \frac{\pi}{2}$ is**

A $\frac{4}{\pi}$

B $\frac{\pi}{4}$

C $\frac{2}{\pi}$

D $\frac{-\pi}{2}$

Answer: A

Explanation:

$\frac{dy}{d\theta} = -\sin\theta + \sin\theta + \theta\cos\theta = \theta\cos\theta$

$\frac{dx}{d\theta} = \cos\theta + \cos\theta - \theta\sin\theta = 2\cos\theta - \theta\sin\theta$

$\frac{dy}{dx} = \frac{dy}{d\theta} \times \frac{d\theta}{dx} = \frac{\theta\cos\theta}{2\cos\theta - \theta\sin\theta}$

Substituting $\theta = \frac{\pi}{2}$ we get $\frac{4}{\pi}$

137. **A, B are end points of the longest chord of a circle of radius 3 units. If O is the centre of the circle and C is a point on the circle such that AC = AO,then the perimeter of the triangle ABC is**

A $9 + 3\sqrt{3}$

B $9\sqrt{3}$

C $6 + 3\sqrt{3}$

D $3 + 6\sqrt{3}$

Answer: A

138. **If the diagonals of a rhombus are 14 cm and 48 cm, then its area in square centimetres is**

A 84

B 168

C 336

D 100

Answer: C

Explanation:

Given, diagonals of the rhombus are 14 cm and 48 cm

$\therefore$ Area of the rhombus = $\frac{1}{2} \times d_1 \times d_2$ = $\frac{1}{2} \times 14 \times 48$ = 336 cm^2

Hence, the correct answer is Option C

139. **If the y-intercept of the straight line (2 + 3k) x + (7 - 2k) y + (4k + 3) = 0 is 1, then k =**

A 1

B -1

C 5

D -5

Answer: D

Explanation:
Since y-intercept is 1, so at x = 0 y should be equal to 1.

Substituting x = 0 and y = 1 in the equation,

(2 + 3k)0 + (7 - 2k)1 + (4k + 3) = 0

$\Rightarrow$ 7 - 2k + 4k + 3 = 0

$\Rightarrow$ 2k = -10

$\Rightarrow$ k = -5

Hence, the correct answer is Option D

140. **If (0, 0), (0, 4), (3, 0) are vertices of a triangle, then the distance between the circumcentre and the orthocentre of the triangle is**

A 5

B $\frac{5}{2}$

C $\frac{5}{4}$

D $\sqrt{5}$

Answer: B

Explanation:
As we can see the given triangle is a right-angled triangle. Hence its orthocentre(0,0). Circumcentre will be at the midpoint of hypotenuse i.e. (1.5,2)

Distance between them $\sqrt{(1.5)^2 + (2)^2} = \sqrt{6.25} = 2.5$

141. **The mode of the frequency distribution given below is**

x:	10	12	14	16	18	20	22	24
Frequency(f):	3	7	11	25	27	20	12	9

A 12

B 16

C 17

D 18

Answer: D

142. **The arithmetic mean of the observations 29, 30, 31, ..., 289 is**

A 318

B 159

C $\frac{317}{2}$

D $\frac{635}{2}$

Answer: B

Explanation:
No of terms here is 289-29+1 = 261

∴ The arithmetic mean of the observations = $\frac{\frac{261}{2}(289+29)}{261}$

= $\frac{318}{2}$

= 159

Hence, the correct answer is Option B

143. **The median of the following data is**

Xi:	25	30	35	40	45	50	55	60	65
Frequency(Fi):	4	9	10	13	17	25	31	14	7

A 40

B 45

C 50

D 55

Answer: C

144. **The geometric mean of the observations 1, 4, 9, 27, 256 is**

A 12

B 21

C 28

D 121

Answer: A

Explanation:

G.M. of the given observations = $\sqrt[5]{(1)(4)(9)(27)(256)}$

$= \sqrt[5]{1 \times 2^2 \times 3^2 \times 3^3 \times 2^8}$

$= \sqrt[5]{2^{10} \times 3^5}$

$= 2^2 \times 3$

$= 12$

145. **If the standard deviation of 7, 10, 13, 16, ..., 121 is σ, then the standard deviation of 50, 71, 92, 113, ..., 848 is**

A 36 σ

B 6 σ

C 7 σ

D 49 σ

Answer: C

146. **If 7 coins are tossed at random, then the probability that even number of heads appear is**

A $\frac{1}{2^7}$

B $\frac{2^7-1}{2^7}$

C $\frac{1}{2}$

D $\frac{1}{4}$

Answer: C

147. **If two fair dice are thrown at random, then the probability that the sum of the digits on their faces is a prime number is**

A $\frac{11}{36}$

B $\frac{25}{36}$

C $\frac{5}{12}$

D $\frac{7}{12}$

Answer: C

Explanation:
Cases when the sum of the numbers on the dice is a prime number (1,1),(2,1),(1,2),(3,2),(2,3),(6,1),(1,6),(6,5),(5,6),(4,3),(3,4),(2,5),(5,2),(1,4),(4,1)

Hence total of 15 cases out of a possible 36. Probability is 15/36 or 5/12

148. **The probability that A can solve a problem is $\frac{7}{12}$ and for B it is $\frac{9}{17}$. If both If both of them try independently, then the probability that the problem is solved is**

A $\frac{5}{12}$

B $\frac{10}{51}$

C $\frac{7}{12}$

D $\frac{41}{51}$

Answer: D

Explanation:
Probability that the problem is solved = 1- (Probability that the problem is not solved)=1-($\frac{5}{12} \times \frac{8}{17}$ = 1-(40/204)=164/204=41/51

149. **If the letters of the word WISDOM are permuted at random, then the probability that the vowels do not cometogether is**

A $\frac{1}{3}$

B $\frac{1}{6}$

C $\frac{2}{3}$

D $\frac{5}{6}$

Answer: C

Explanation:
Total permutation possible = 6!=720

Number of combination in which vowels (O,I) are together= 5!(2!)=240

Hence the number of permutation in which vowels are not together =720-240=480

Probability= 480/720=2/3

150. **If a number is chosen at random from the first 58 natural numbers, then the probability that the number chosen is a prime number is**

A $\frac{15}{58}$

B $\frac{8}{29}$

C $\frac{17}{58}$

D $\frac{9}{29}$

Answer: B

Explanation:
The prime numbers in the first 58 natural numbers = 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53

Number of prime numbers in the first 58 natural numbers = 16

Hence probability = $\frac{16}{58} = \frac{8}{29}$

Communication Ability

Instructions [151 - 156]

Choose the correct meaning of the word given :

151. **Assiduous**

A hopeful

B careful

C generous

D careless

Answer: B

152. **Statute**

A a set of rules

B a symbol of status

C a small statue

D structural design

Answer: A

153. **Amnesty**

A forgetfulness

B selfishness

C pardon

D dishonesty

Answer: C

154. **Close-fisted**

A miserly

B secretive

C narrow-minded

D expensive

Answer: A

155. **Ruminate**

A fulminate

B chew the cud

C germinate

D cuddle

Answer: B

156. **Premise**

A argue

B presuppose

C compel

D unfold

Answer: B

Instructions [157 - 170]

Fill in the blank choosing the correct word :

157. **Sentimental longing is known as .....**

A amnesia

B nostalgia

C dyslexia

D euthanasia

Answer: B

158. **The dog is now ..... It won't spoil your carpet.**

A house-broken

B house-bound

C house-proud

D house-rested

Answer: A

159. **A philanthropist is one who generally .....**

A hates everyone

B likes everyone

C harms everyone

D befriends everyone

Answer: D

160. **The recipe calls for two ..... of milk.**

A cupsful

B cupfuls

C cupful

D cup

Answer: B

161. **Securities in companies that are considered to be without risk are known as**

A equities

B mutual fund

C blue chips

D ordinary shares

Answer: C

162. **Intellectual capital implies**

A the physical assets of intellectuals.

B the mental agility of the workers.

C the capital city of intellectuals.

D the intellectuals in the capital city.

Answer: B

163. **'Agenda' means**

A meeting of agents

B development of an agency

C maintenance of agents

D items for consideration

Answer: D

164. **Managerial Economicsis a branch of economics closely related to**

A Macroeconomics

B Welfare economics

C Microeconomics

D Econometrics

Answer: C

165. **The traffic density of visitors to a retail outlet is.expressed in terms of.....**

A footfalls

B footprints

C footsteps

D footage

Answer: A

166. **Netiquette means**

A etiquette on the internet

B net linkage

C network topology

D network layers

Answer: A

167. **The reversible transformation of data from the plain text to ciphertext is .....**

A abstraction

B encryption

C inversion

D access modification

Answer: B

168. **A string of zeroes and ones used for authenticating sender of a document in computer communication is called**

A format

B parity code

C handshake protocol

D digital signature

Answer: D

169. **CRT stands for**

A Common Resource Terminal

B Computer Recording Terminal

C Computer Recording Tube

D Cathode Ray Tube

Answer: D

170. **Pixel stands for**

A picture element

B color coding

C camera identification

D amobile application

Answer: A

Instructions [171 - 177]

Choose the correct answer:

171. **The passive form of the sentence “He wrote a letter to his friend” is**

A A letter was written by him.

B A letter was written by him tohis friend.

C He was writing letter to his friend.

D A letter was being written to his friend.

Answer: B

172. **The grammatically correct sentence among the followingis :**

A It ought to be she with who you share your secrets, not I.

B You ought share your secrets not with I but she.

C You must oughtto share secrets with her, not me.

D It ought to be her with whom youshare your secrets, not me.

Answer: D

173. **A: You had your entrancetest yesterday. How did you do?**
B: Alas! 1am undone. B is

A excited

B elated

C doubtful

D dejected

Answer: D

174. **A: Why are you thinking of closing the factory?**
B: It's because of my investment having gone down the drain.
B implies

A that he hid currencynotes in the pipes thatled to the drain.

B that the drain gulped up his currency due to heavy rain.

C that he could not estimate the length or depth ofthe pipes that led to the drain.

D that all the moneyhe had invested in the factory was totally wasted.

Answer: D

175. **I <u>ran into</u> an old friend at the mall. The underlined phrase means**

A dashed against

B met unexpectedly

C drove up to

D fought with

Answer: B

176. **A: Iam late to the practice. Can I go now and say sorry to the coach?**
B: Let's not try to meet her now. She's in a temper.
The coach is

A brooding

B angry

C sleeping

D doubting

Answer: B

177. **I always take her advice with a pinch of salt.**
The speaker implies that

A he does not completely believe her advice.

B she always charges a fee for her advice.

C she forces him to follow her advice.

D she is always rudein her speech.

Answer: A

Instructions [178 - 185]

Fill in the blanks with the appropriate phrase/verb/preposition:

178. **He ..... the favour of the chairman.**

A bathed in

B brought in

C basked in

D baked in

Answer: C

179. **The examination ..... begun by now, but hasn't.**

A should have

B might have

C must have

D would have

Answer: A

180. **The evening's function was disrupted ..... a major accident.**

A but for

B because of

C inspite of

D in lieu of

Answer: B

181. **The bride entered the hall late as it took time for her to .....**

A dress on

B dress over

C dress up

D dress for

Answer: C

182. **They always sit ..... to each other in the class, but they don't talk.**

A besides

B across

C beside

D next

Answer: D

183. **Children ought to live ..... their parents' expectations.**

A under

B until

C up to

D unto

Answer: C

184. **I found the book which I ..... earlier.**

A lose

B lost

C had lost

D would lose

Answer: C

185. **We decided that if it was fine, we ..... walk home.**

A shall

B should

C will

D have to

Answer: B

Instructions [186 - 190]

Read the following passage and answer questions:

What will man be like in the future-in 5000 or even 50,000 years from now? We can only make a guess, of course, but we can be sure that he will be different from what he is today. For man is slowly changing all the time.

Man, even five hundred years ago, was shorter than he is today. Now, on an average, men are about three inchestaller. Five hundred years is a relatively longer period of time, so we may assume that man will continue to grow taller.

Again, in the modem world we use our brains a great deal. Even so, westill use only 20% of its capacity. Gradually we shall have to use our brains more and eventually we shall need larger ones! This is likely to makethe head, particularly the forehead, to grow larger.

Now-a-days we use our eyes so much that very often they become weaker and we have to wear glasses. But in future man's eyes will grow stronger. Since we tend to makeless use of our armsand legs, they are likely to grow weaker. However, fingers will grow more sensitive because of constant use. Hair will probably disappear from the body altogether in course of time as it does not serve any useful purpose. In the future then, both the sexes are likely to be bald.

All the same,inspite ofall these changes, future man will still have a lot in common with us. He will still be a human being, with thoughts and emotions similar to our own.

186. **The test tells us a lot about how future man**

A will look

B will live

C will feel

D will think

Answer: A

187. **The reason for believing that future man will be differentis that he**

A never stops growing.

B is taller by three inches now.

C was shorter earlier.

D never stops changing.

Answer: D

188. **The larger forehead will be a consequence of**

A the eyes growing stronger.

B the present under utilization of the brain.

C the greater use of the brain.

D hair disappearing from the body.

Answer: C

189. **The future man will probably**

A have bigger eyes.

B have to wear glasses.

C become weaker.

D see better.

Answer: D

190. **The future man's hair will**

A stop growing completely.

B will grow longer.

C fall more often.

D will grow shorter.

Answer: A

Instructions [191 - 195]

Read the following passage and answer questions

A shot smashed the wing-mirror and I trod on the accelerator even harder trying to coax a little more speed out ofthe screaming engine. Beside me Priya was quite calm, but I could sense that she was as terrified as I was. She was clinging onto herseat so as not to be thrown on to me as we hurled round bends and comers, and bounced up and down on the rough surface. It was no more than cart track, really. My only thoughtwas to get to a town or village or at least to some sign of humanity — they would never dare shoot us down in cold blood in front of witnesses.

The little van was out of sight now round oneof the bends, but when we cameto an unexpectedly straight part of the lane, I could see it behind us in the driving mirror. Then there was a crash as our rear window exploded, a bullet whistled between our heads, and the windscreen shattered into a thick white fog.

“Knock it out, Priya! For God’s sake, knockit out!” I screamed. Priya was sobbing, choking back fear and with her gloved hands she beat at the windscreen, using her hand bag as a hammer and managed to knock a hole through which I could see the road ahead. The wind blew the broken glass in and my lap and chest were covered withlittle pebbles of glasses. Nowan icy gale whistled through the hole and madeit difficult to see where
we were going. My eyes were watering andit was all I could make out the bendsinthelane.

191. **The narrator, along with his companion, was driving fast because**

A there were no people in the lane.

B he was scared.

C the engine was screaming.

D he wanted to go to some place with people.

Answer: D

192. **It was difficult to drive because**

A the lane was only a cart track.

B the car wouldn’t go veryfast.

C the lane was curved and rough.

D the driver of the car had been sho

Answer: A

193. **The narrator thought that**

A the people in the van wanted to break their wind screen.

B the people in the van wouldn’t kill him and Priya unless they could do it unobserved.

C the people in the van did not really intend to kill the two of them.

D the people in the van could escape because their car was faster.

Answer: B

194. **Priya had to knock the wind screen because**

A the people behind were shooting at them.

B the driver could notsee the road.

C there was a thick fog inside the car.

D the rear window had exploded.

Answer: B

195. **The narrator couldn't see very well because**

A it was dark.

B there were too many bends in the road.

C his eyes were watering.

D Priya hammered the windscreen.

Answer: C

Instructions [196 - 200]

Read the following passage and answer questions

Duty rounds the wholeoflife, from our entrance intoit until our exit from it. There is duty to superiors, duty to inferiors, and duty to equals. There is duty to man, and duty to God. Wherever there is power to use or to direct, there is duty.

The abiding sense of duty is the very crown ofcharacter. It is the upholding law of man in his highest attitudes. Withoutit the individual totters and falls before the first purr of adversity or temptation. Whereas, inspired byit, the weakest becomes strong and full of courage.

Duty is based upon a sense of justice — justice inspired by love, which is the most perfect form of goodness. Duty is not a sentiment, but a principle pervading life. It exhibits itself in conduct and in acts, which are mainly determined by man’s conscience and free will.

The voice of conscience speaksin duty alone. Withoutits regulating and controlling influence, the brightest and greatest intellect may be merely a light that leads us astray. Conscience sets a man upon his feet. Conscience is the moral governor of the heart. It is the governor of right action, right thought, right faith and right life. Only through its dominating influence can the noble and upright character be fully developed.

196. **Duty is discovered in .....**

A conscientious actions

B acts without conscience

C unconscious acts

D sentimental responses

Answer: A

197. **Duty is an outward form of .....**

A doubts with regard to the working of conscience

B emotional responses that do not heed the voice of conscience

C the ambiguousrole ofconscience

D he regulating voice of conscience

Answer: D

198. **Duty is bound up with .....**

A wealth

B power

C physique

D education

Answer: B

199. **Duty plays a vital role .....**

A in the younger days

B in the middle of life

C at the end of life

D from the cradle to the grave

Answer: D

200. **The tone of the passage is .....**

A sadistic

B cynical

C optimistic

D pessimistic

Answer: C