

## CDS II 2018

1. The highest four-digit number which is divisible by each of the numbers 16, 36, 45, 48 is  
a. 9180      b. 9360      c. 9630      d. 9840
2. If  $x = y^a$ ,  $y = z^b$  and  $z = x^c$ , then the value of  $abc$  is  
a. 1      b. 2      c. -1      d. 0
3. If  $x = 2 + 2^{2/3} + 2^{1/3}$ , then the value of the expression  $x^3 - 6x^2 + 6x$  will be  
a. 2      b. 1      c. 0      d. -2
4. How many five-digit numbers of the form XXYXX is/are divisible by 33?  
a. 1      b. 3      c. 5      d. Infinite
5. A five-digit number XY235 is divisible by 3 where X and Y are digits satisfying  $X + Y \leq 5$ .

What is the number of possible pairs of values of (X, Y)?

- a. 5      b. 6      c. 7      d. 9
6. If  $x^2 - 6x - 27 > 0$ , then which one of the following is correct?  
a.  $-3 < x < 9$       b.  $x < 9$  or  $x > -3$   
c.  $x > 9$  or  $x < -3$       d.  $x < -3$  only
7. The number of divisors of the number 38808, exclusive of the divisors 1 and itself, is  
a. 74      b. 72      c. 70      d. 68
8. HCF and LCM of two polynomials are  $(x + 3)$  and  $(x^3 - 9x^2 - x + 105)$  respectively. If one of the two polynomials is  $x^2 - 4x - 21$ , then the other is  
a.  $x^2 + 2x - 21$       b.  $x^2 + 2x + 15$   
c.  $x^2 - 2x - 15$       d.  $x^2 - x - 15$
9. If  $\alpha$  and  $\beta$  are two real numbers such that  $\alpha + \beta = -\frac{q}{p}$  and  $\alpha\beta = \frac{r}{p}$ , where  $1 < p < q < r$ , then which one of the following is the greatest?  
a.  $\frac{1}{\alpha + \beta}$       b.  $\frac{1}{\alpha} + \frac{1}{\beta}$       c.  $-\frac{1}{\alpha\beta}$       d.  $\frac{\alpha\beta}{\alpha + \beta}$
10. Two workers 'A' and 'B' working together completed a job in 5 days. Had 'A' worked twice as efficiently as he actually did and 'B' worked one-third as efficiently as he actually did, the work would have completed in 3 days. In how many days could 'A' alone complete the job?  
a.  $3\frac{1}{2}$  days      b.  $4\frac{1}{6}$  days  
c.  $5\frac{1}{2}$  days      d.  $6\frac{1}{4}$  days

11. If  $x^6 + \frac{1}{x^6} = k\left(x^2 + \frac{1}{x^2}\right)$ , then  $k$  is equal to?

a.  $\left(x^2 - 1 + \frac{1}{x^2}\right)$

b.  $\left(x^4 - 1 + \frac{1}{x^4}\right)$

c.  $\left(x^4 + 1 + \frac{1}{x^4}\right)$

d.  $\left(x^4 - 1 - \frac{1}{x^4}\right)$

12. If the sum of the squares of three consecutive natural numbers is 110, then the sum of their cubes is

a. 625

b. 654

c. 684

d. 725

13. The product of two integers  $p$  and  $q$ , when  $p > 60$  and  $q > 60$ , is 7168 and their HCF is 16. The sum of these two integers is

a. 256

b. 184

c. 176

d. 164

14. If  $\log_{10}2 = 0.3010$  and  $\log_{10}3 = 0.4771$ , then the value of  $\log_{100}(0.72)$  is equal to

a. 0.9286

b. 1.9286

c. 0.8572

d. 1.8572

15. If  $a^x = b^y = c^z$  and  $abc = 1$ , then the value of  $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$  will be equal to

a. -1

b. 0

c. 1

d. 3

16. If  $\alpha$  and  $\beta$  are the roots of the equation  $ax^2 + bx + c = 0$ , then the value of  $\frac{1}{a\alpha + b} + \frac{1}{a\beta + b}$  is

a.  $\frac{a}{bc}$

b.  $\frac{b}{ac}$

c.  $\frac{c}{ab}$

d.  $\frac{1}{abc}$

17. Consider the following statements in respect of three 3-digit numbers XYZ, YZX and ZXY :

1. The sum of the numbers is not divisible by  $(X + Y + Z)$ .

2. The sum of the numbers is divisible by 111.

Which of the above statements is/are correct?

a. 1 only

b. 2 only

c. Both 1 and 2

d. Neither 1 nor 2

18. The number of all pairs  $(m, n)$ , where  $m$  and  $n$  are positive integers such that  $\frac{1}{m} + \frac{1}{n} - \frac{1}{mn} = \frac{2}{5}$  is

a. 6

b. 5

c. 4

d. 2

19. If  $a = xy^{p-1}$ ,  $b = yz^{q-1}$ ,  $c = zx^{r-1}$ , then  $a^{q-r}b^{r-p}c^{p-q}$  is equal to

- a.  $abc$       b.  $xyz$       c.  $0$       d. None of the above

20. The number of sides of two regular polygons are in the ratio 5 : 4. The difference between their interior angles is  $9^\circ$ . Consider the following statements :

1. One of them is a pentagon and the other is a rectangle.
2. One of them is a decagon and the other is an octagon.
3. The sum of their exterior angles is  $720^\circ$ .

Which of the above statements is/are correct?

- a. 1 only      b. 2 only      c. 1 and 3      d. 2 and 3

21. The minimum value of the expression  $2x^2 + 5x + 5$  is

- a. 5      b.  $\frac{15}{8}$       c.  $-\frac{15}{8}$       d. 0

22. If H is the harmonic mean of P and Q, then the value of  $\frac{H}{P} + \frac{H}{Q}$  is

- a. 1      b. 2      c.  $\frac{P+Q}{PQ}$       d.  $\frac{PQ}{P+Q}$

23. The sum of all possible products taken two at a time out of the numbers  $\pm 1, \pm 2, \pm 3, \pm 4$  is

- a. 0      b.  $-30$       c. 30      d. 55

24. The remainder when  $3x^3 - 2x^2y - 13xy^2 + 10y^3$  is divided by  $(x - 2y)$  is equal to

- a. Zero      b.  $y$       c.  $y - 5$       d.  $y + 3$

25. If  $ab + bc + ca = 0$ , then the value of

$$\frac{(b^2 - ca)(c^2 - ab) + (a^2 - bc)(c^2 - ab) + (a^2 - bc)(b^2 - ca)}{(a^2 - bc)(b^2 - ca)(c^2 - ab)}$$

is

- a.  $-1$       b.  $0$       c.  $1$       d.  $2$

26. What is the principal amount which earns Rs. 210 as compound interest for the second year at 5% per annum?

- a. Rs. 2000      b. Rs. 3200      c. Rs. 4000      d. Rs. 4800

27. In an examination, 50% of the candidates failed in English, 40% failed in Hindi and 15% failed in both the subjects. The percentage of candidates who passed in both English and Hindi is
- a. 20%      b. 25%      c. 60%      d. 75%
28. A train 100 m long passes a platform 100m long in 10 seconds. The speed of the train is
- a. 36 kmph      b. 45 kmph      c. 54 kmph      d. 72 kmph
29. A cyclist covers his first 20 km at an average speed of 40 kmph, another 10 km at an average speed of 10 kmph and the last 30 km at an average speed of 40 kmph. Then the average speed of the entire journey is
- a. 20 kmph      b. 26.67 kmph      c. 28.24 kmph      d. 30 kmph
30. In a race of 1000m, A beats B by 150 m, while in another race of 3000 m, C beats D by 400m. Speed of B is equal to that of D. (Assume that A, B, C and D run with uniform speed in all the events). If A and C participates in a race of 6000m, then which one of the following is correct?
- a. A beats C by 250 m      b. C beats A by 250 m  
c. A beats by 115.38m      d. C beats A by 115.38m
31. The sum of ages of a father, a mother, a son Sonu and daughters Savita and Sonia is 96 years. Sonu is the youngest number of the family. The year Sonu
- a. 44 years      b. 45 years      c. 46 years      d. 48 years
32. 'A' is thrice as good a workman as 'B' and takes 10 days less to do a piece of work, than 'B' takes. The number of days taken by 'B' alone to finish the work is
- a. 12      b. 15      c. 20      d. 30
33. Out of 85 children playing badminton or table tennis or both, the total number of girls in the group is 70% of the total number of boys in the group. The number of boys playing only badminton is 50% of the number of boys and the total number of boys playing badminton is 60% of the total number of boys. The number of children playing only table tennis is 40% of the total number of children and a total of 12 children play badminton and the table tennis both. The number of girls playing only badminton is
- a. 14      b. 16      c. 17      d. 35

34. A person bought two articles X and Y from a departmental store. The sum of prices before sales tax was Rs. 130. There was no sales tax on the article X and 9% sales tax on the article Y. The total amount the person paid, including the sales tax was Rs. 136.75. What was the price of the article Y before sales tax?
- a. Rs. 75                      b. Rs. 85                      c. Rs. 123                      d. Rs. 125
35. According to Mr. Sharma's will, half of his property goes to his wife and the rest is equally divided between his two sons, Ravi and Raj. Some years later, Ravi dies and leaves half of his property to his widow and rest to his brother Raj. When Raj dies he leaves half of his property to his widow and remaining to his mother, who is still alive. The mother now owns Rs. 88,000 worth of the property. The total worth of the property of Mr. Sharma was
- a. Rs. 1,00,000                      b. Rs. 1,24,000  
c. Rs. 1,28,000                      d. Rs. 1,32,000
36. X bought 4 bottles of lemon juice and Y bought one bottle of orange juice. Orange juice per bottle costs twice the cost of lemon juice per bottle. Z bought nothing but contributed Rs. 50 for his share of the drink which they mixed together and shared the cost equally. If Z's Rs. 50 is covered from his share, then what is the cost of one bottle of orange juice?
- a. Rs. 75                      b. Rs. 50                      c. Rs. 46                      d. Rs. 30
37. Ten (10) years before, the ages of a mother and her daughter were in the ratio 3 : 1. In another 10 years from now, the ratio of their ages will be 13 : 7. What are their present ages?
- a. 39 years, 21 years                      b. 55 years, 25 years  
c. 75 years, 25 years                      d. 49 years, 31 years
38. In a class of 60 boys, there are 45 boys who play chess and 30 boys who play carrom. If every boy of the class plays at least one of the two games, then how many boys play carrom only?
- a. 30                      b. 20                      c. 15                      d. 10
39. Two equal amounts were borrowed at 5% and 4% simple interest. The total interest after 4 years amounted to Rs. 405. What was the total amount borrowed?
- a. Rs. 1075                      b. Rs. 1100  
c. Rs. 1125                      d. Rs. 1150
40. Twelve (12) men work 8 hours per day and require 10 days to build a wall. If 8 men are available, how many hours per day must they work to finish the work in 8 days?

- a. 10 hours      b. 12 hours      c. 15 hours      d. 18 hours

41. A milk vendor bought 28 litres of milk at the rate of Rs. 8.50 per litre. After adding some water he sold the mixture at the same price. If his gain is 12.5%, how much water did he add?

- a. 4.5 litres      b. 4 litres      c. 3.5 litres      d. 3 litres

42. The minute hand of a clock overtakes the hour hand after every 72 minutes of correct time. How much time does the clock lose or gain in a day of normal time?

- a. Loss  $121\frac{9}{11}$  minutes      b. Loss  $157\frac{1}{11}$  minutes  
c. Gain  $121\frac{9}{11}$  minutes      d. Gain  $157\frac{1}{11}$  minutes

43. A thief steals a car parked in a house and goes away with a speed of 40 kmph. The theft was discovered after half an hour and immediately the owner sets off in another car with a speed of 60 kmph. When will the owner meet the thief?

- a. 55 km from the owner's house and one hour after the theft  
b. 60 km from the owner's house and 1.5 hours after the theft  
c. 60 km from the owner's house and 1.5 hours after the discovery of the theft  
d. 55 km from the owner's house and 1.5 hours after the theft

44. X and Y together can finish a job in 6 days. X can alone do the same job in 12 days. How long will Y alone take to do the same job?

- a. 16 days      b. 12 days  
c. 10 days      d. 8 days

45. Twelve (12) persons can paint 10 identical rooms in 16 days. In how many days can 8 persons paint 20 such rooms?

- a. 12      b. 24      c. 36      d. 48

46. There are  $n$  zeros appearing immediately after the decimal point in the value of  $(0.2)^{25}$ . It is given that the value of  $\log_{10}2 = 0.30103$ . The value of  $n$  is

- a. 25                      b. 19                      c. 18                      d. 17

47. The ratio of the sum and difference of the ages of the father and the son is 11 : 3. Consider the following statements :

1. The ratio of their ages is 8 : 5.
2. The ratio of their ages after the son attains twice the present age will be 11 : 8.

Which of the statements given above is/are correct?

- a. 1 only                      b. 2 only  
c. Both 1 and 2                      d. Neither 1 nor 2

48. The solution of linear inequalities  $x + y \geq 5$  and  $x - y \leq 3$  lies

- a. Only in the first quadrant                      b. In the first and second quadrants  
c. In the second and third quadrants                      d. In the third and fourth quadrants

49. It is given that the equations  $x^2 - y^2 = 0$  and  $(x - a)^2 + y^2 = 1$  have single positive solution.

For this, the value of  $a'$  is

- a.  $\sqrt{2}$                       b. 2                      c.  $-\sqrt{2}$                       d. 1

50. If  $\alpha$ ,  $\beta$  and  $\gamma$  are the zeros of the polynomial  $f(x) = ax^3 + bx^2 + cx + d$ , then  $\alpha^2 + \beta^2 + \gamma^2$  is equal to

- a.  $\frac{b^2 - ac}{a^2}$                       b.  $\frac{b^2 - 2ac}{a}$   
c.  $\frac{b^2 + 2ac}{b^2}$                       d.  $\frac{b^2 - 2ac}{a^2}$

**Consider the following for the next 04 (four) items that follow :**

In an examination of Class XII, 55% students passed in Biology, 62% passed in Physics, 60% passed in Chemistry, 25% passed in Physics and Biology, 30% passed in Physics and Chemistry, 28% passed in Biology and Chemistry. Only 2% failed in all the subjects.

51. What percentage of students passed in all the three subjects?

- a. 6                      b. 5                      c. 4                      d. 3

52. What percentage of students passed in exactly one subject?

- a. 21                      b. 23                      c. 25                      d. 27

53. If the number of students is 360, then how many passed in at least two subjects?

- a. 270                      b. 263                      c. 265                      d. 260

54. What is the ratio of number of students who passed in both Physics and Chemistry to number of students who passed in both Biology and Physics but not Chemistry?

- a. 7 : 10                      b. 10 : 7                      c. 9 : 7                      d. 7 : 9

55. Data on ratings of hotels in a city is measured on

- a. Nominal scale                      b. Ordinal scale  
c. Interval scale                      d. Ratio scale

56. The average marks of Section A are 65 and that of Section B are 70. If the average marks of both the sections combined are 67, then the ratio of number of students of Section A to that of Section B is

- a. 3 : 2                      b. 1 : 3                      c. 3 : 1                      d. 2 : 3

57. The median of 19 observations is 30. Two more observations are made and the values of these are 8 and 32. What is the median of the 21 observations?

- a. 32                      b. 30  
c. 20                      d. Cannot be determined due to insufficient data

58. As the number of observations and classes increases, the shape of a frequency polygon:

- a. Tends to become jagged  
b. Tends to become increasingly smooth





a.  $\sqrt{2} - 1$       b.  $\frac{\sqrt{3} + 1}{2\sqrt{2}}$       c.  $\frac{\sqrt{3} + 1}{2\sqrt{2}}$  d.  $\frac{(\sqrt{3} + 1)(\sqrt{2} - 1)}{2\sqrt{2}}$

64. Let  $\sin(A + B) = \frac{\sqrt{3}}{2}$  and  $\cos B = \frac{\sqrt{3}}{2}$ , where A, B are acute angle. What is  $\tan(2A - B)$  equal to?

a.  $\frac{1}{2}$       b.  $\sqrt{3}$       c.  $\frac{1}{\sqrt{3}}$       d. 1

65. Consider the following statements :

1. If  $\frac{\cos \theta}{1 - \sin \theta} + \frac{\cos \theta}{1 + \sin \theta} = 4$ , where  $0 < \theta < 90^\circ$ , then  $\theta = 60^\circ$ .

2. If  $3 \tan \theta + \cot \theta = 5 \operatorname{cosec} \theta$ , where  $0 < \theta < 90^\circ$ , then  $\theta = 60^\circ$ .

Which of the statements given above is/are correct?

- a. 1 only      b. 2 only  
c. Both 1 and 2      d. Neither 1 nor 2

66. Consider the following statements :

1.  $\cos^2 \theta = 1 - \frac{p^2 + q^2}{2pq}$ , where  $p, q$  are non-zero real numbers, is possible only when

$$p = q$$

2.  $\tan^2 \theta = \frac{4pq}{(p + q)^2} - 1$ , where  $p, q$  are non-zero real numbers, is possible only when

$$p = q$$

Which of the statements given above is/are correct?

- a. 1 only      b. 2 only  
c. Both 1 and 2      d. Neither 1 nor 2

67. Consider the following statements :

1.  $\cos \theta + \sec \theta$  can never be equal to 1.5.





83. The areas of two similar triangles are  $(7 - 4\sqrt{3}) \text{ cm}^2$  and  $(7 + 4\sqrt{3}) \text{ cm}^2$  respectively.

The ratio of their corresponding sides is

- a.  $7 - 4\sqrt{3}$     b.  $7 - 3\sqrt{3}$     c.  $5 - \sqrt{3}$     d.  $5 + \sqrt{3}$

84. The chord of a circle is  $\sqrt{3}$  times its radius. The angle subtended by this chord at the minor arc is  $k$  times the angle subtended at the major arc. What is the value of  $k$ ?

- a. 5    b. 2    c.  $\frac{1}{2}$     d.  $\frac{1}{5}$

85. In a triangle ABC, the sides AB, AC are produced and the bisectors of exterior angles of  $\angle ABC$  and  $\angle ACB$  intersect at D. If  $\angle BAC = 50^\circ$ , then  $\angle BDC$  is equal to

- a.  $115^\circ$     b.  $65^\circ$     c.  $55^\circ$     d.  $40^\circ$

86. Two cones have their heights in the ratio 1 : 3. If the radii of their bases are in the ratio 3 : 1, then the ratio of their volumes will be

- a. 1 : 1    b. 2 : 1    c. 3 : 1    d. 9 : 1

87. If two lines AB and CD intersect at O such that  $\angle AOC = 5 \angle AOD$ , then the four angles at O are

- a.  $40^\circ, 40^\circ, 140^\circ, 140^\circ$     b.  $30^\circ, 30^\circ, 150^\circ, 150^\circ$   
c.  $30^\circ, 45^\circ, 75^\circ, 210^\circ$     d.  $60^\circ, 60^\circ, 120^\circ, 120^\circ$

88. If a point P moves such that the sum of the squares of its distances from two fixed points A and B is a constant, then the locus of the point P is

- a. A straight line    b. A circle  
c. Perpendicular bisector of AB    d. An arbitrary curve

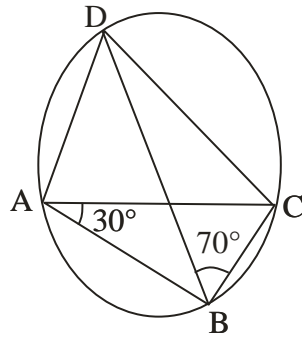
89. If ABC is a right-angled triangle with AC as its hypotenuse, then which one of the following is correct?

- a.  $AC^3 < AB^3 + BC^3$     b.  $AC^3 > AB^3 + BC^3$   
c.  $AC^3 \leq AB^3 + BC^3$     d.  $AC^3 \geq AB^3 + BC^3$

90. The area of the region bounded externally by a square of side  $2a$  cm and internally by the circle touching the four sides of the square is

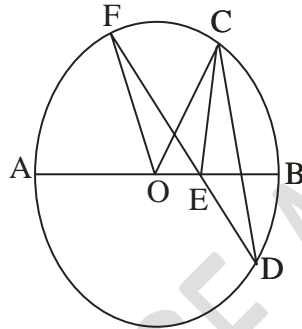
- a.  $(4 - \pi)a^2$     b.  $(\pi - 2)a^2$     c.  $(8 - \pi)a^2/2$     d.  $(\pi - 2)a^2/2$





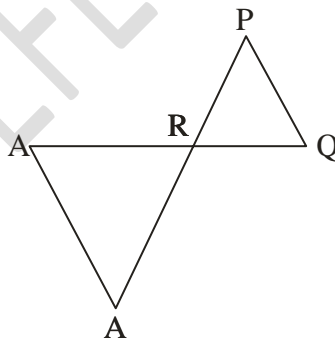
- a.  $70^\circ$       b.  $75^\circ$       c.  $80^\circ$       d.  $90^\circ$

95. In the figure given below, AB is the diameter of the circle whose centre is at O. Given that  $\angle ECD = \angle EDC = 32^\circ$ , then  $\angle CEF$  and  $\angle COF$  respectively are :



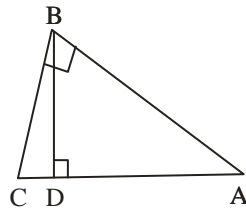
- a.  $32^\circ, 64^\circ$       b.  $64^\circ, 64^\circ$       c.  $32^\circ, 32^\circ$       d.  $64^\circ, 32^\circ$

96. In the figure given below,  $\triangle ABR \sim \triangle PQR$ . If  $PQ = 3$  cm,  $AB = 6$  cm,  $BR = 8.2$  cm and  $PR = 5.2$  cm, then QR and AR are respectively



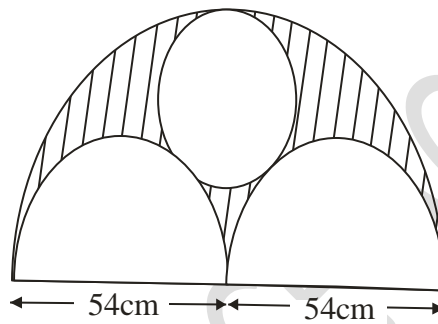
- a. 8.2 cm, 10.4 cm      b. 4.1 cm, 6 cm  
c. 2.6 cm, 5.2 cm      d. 4.1 cm, 10.4 cm

97. In the figure given below, ABC is a triangle with AB perpendicular to BC. Further BD is perpendicular to AC. If AD = 9 cm and DC = 4 cm, the what is the length of BD?



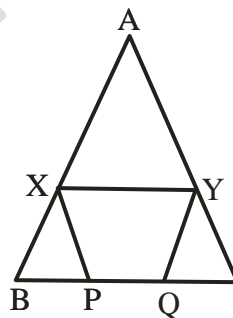
- a.  $\frac{13}{36}$  cm      b.  $\frac{36}{13}$  cm      c.  $\frac{13}{2}$  cm      d. 6 cm

98. In the figure given below, the diameter of bigger semicircle is 108 cm. What is the area of the shaded region?



- a.  $201\pi \text{ cm}^2$       b.  $186.3\pi \text{ cm}^2$       c.  $405\pi \text{ cm}^2$       d.  $769.5\pi \text{ cm}^2$

99. In the figure shown below, ABC is an equilateral triangle with each side of length 30 cm. XY is parallel to BC, XP is parallel to AC and YQ is parallel to AB. If XY + XP + YQ is 40 cm, then the value of PQ is

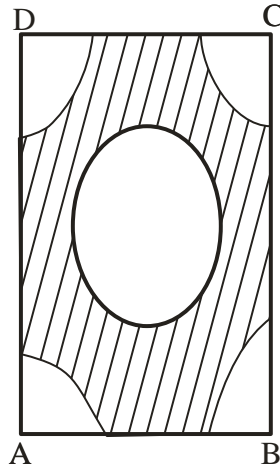


- a. 5 cm      b. 12 cm      c. 15 cm      d. 10 cm



100. In the figure given below, ABCD is a square of side 4 cm. Quadrants of a circle of diameter 2 cm are removed from the four corners and a circle of diameter 2 cm is also removed.

What is area of the shaded region?



- a.  $5\frac{7}{9} \text{ cm}^2$       b.  $7\frac{7}{9} \text{ cm}^2$       c.  $9\frac{5}{7} \text{ cm}^2$       d.  $9\frac{5}{6} \text{ cm}^2$