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B.Ed Science Entrance 2021

Mathematics

Total Shifts– 7

Total Questions- 140

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9 Oct 2021 1st Shift

1- The ratio of the first and second-class fares between the two stations is 7 : 3 and the ratio of the number of passengers traveling by first and second-class between these 2 stations is 1 : 21. If the total collected fare is ₹ 5000, then what is the amount collected from first class passengers?

A) ₹ 450

B) ₹ 500

C) ₹ 300

D) ₹ 550

2- If D is a point on side BC of a ΔABC such that AD = BD = CD, then

A) AB² + AC² = BC²

B) AB . AC = AD²

C) AD² + DC² = AC²

D) AD² + BD² = AB²

3- Total number of prime factors in the product of

$2^{15} \times 6^{27} \times 7^8 \times 10^{13} \times 11^9 \times 323^{21}$ is

A) 12

B) 5

C) 7

D) 10

$$(1 + \tan^2 \theta) + \left(1 + \frac{1}{\tan^2 \theta}\right) =$$

A) $\dfrac{1}{(\sin^2 \theta + \sin^4 \theta)}$

B) $\sin^2\theta + \sin^4\theta$

C) $\dfrac{1}{(\sin^2 \theta - \sin^4 \theta)}$

D) $\sin^2\theta - \sin^4\theta$

4-

The decimal expansion of $\dfrac{427}{2^3 \times 5^4 \times 7}$ has

A) 1 digit after the decimal point

B) 4 digits after the decimal point

C) 3 digits after the decimal point

D) 2 digits after the decimal point

5- If the sum of two numbers is 100 and the difference between their squares is 3000, then the numbers are

A) 65 and 35

B) 55 and 45

C) 60 and 40

D) 75 and 25

6- If f : R → R and g : R → R defined by f(x) = 2x + 3 and g(x) = x2

+ 7, then the value of x for which f(g(x)) = 35 is

A) ± 1

B) ± 3

C) ± 2

D) ± 4

7- If X = {p, q, r, s} and Y = {6, 7, 8}, then number of one-one functions from X to Y are

A) 12

B) 3

C) 0

D) 4

8- If Set X has 5 elements and the set Y has 6 elements, then the number of injective functions that can be defined from set X to set Y is

A) 120

B) 30

C) 720

D) 360

9- If the roots of the equation (b-c)x²+(c-a)x +a-b = 0 are equal, then, which of the following options are true?

A) 2b = a+ c
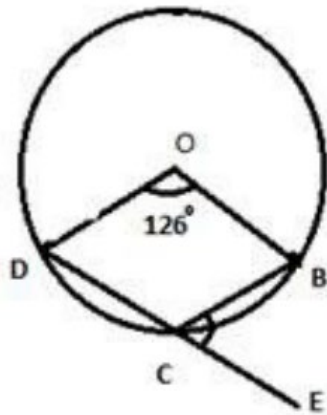
B) 2c = a+b

C) a+b+c = 0

D) 2a = b+c

If $\dfrac{36}{x^{\frac{6}{5}}} = \dfrac{x^{\frac{9}{5}}}{48}$

10- then the value of x is

A) 12

B) 6

C) 8

D) 10

11- In the given figure, O is the centre of the circle,

, $\angle BOD = 126°$, side DC is produced to E. $\angle BCE = ?$

A) 63°

B) 60°

C) 42°

D) 126°

12- What is the value of $3^{3^{(-a)}}$

A) $-\sqrt[27]{3}$

B) $\sqrt[27]{3}$

C) $\dfrac{1}{27}$

D) $-\dfrac{1}{27}$

$$\frac{\log_3 32}{\log_9 16 \log_4 10}$$

A) $3 \log_{10} 2$

B) $2 \log_{10} 3$

C) $4 \log_{10} 3$

D) $5 \log_{10} 2$

13- tan9˚ tan21˚ tan60˚ tan69˚ tan81˚ =

A) $1/\sqrt{3}$

B) $\sqrt{3}$

C) 0

D) 1

14- If 3x +2y − z = − 1, − 2x − 2y +3z = 5 and 5x +2y − z = 3, then the value of x+y+z is

A) 4

B) 1

C) 0

D) 10

If $\log_3[\log_2(x^2 - x - 48)] = 1$

15- and x is a natural number, then the value of x is

A) 8

B) 6

C) 7

D) 10

16- $\dfrac{cos\theta}{1 - tan\theta} + \dfrac{sin\theta}{1 - cot\theta} =$

A) cosθ - sinθ

B) cotθ - tanθ

C) cotθ + tanθ

D) cosθ + sinθ

17- $(2 \cos^3 A - \cos A)/(\sin A - 2 \sin^3 A) =$

A) tan A

B) cot A

C) cos A

D) sin A

9 Oct 2021 2nd Shift

18- A natural number, when decreased by 7, becomes 60 times its reciprocal. The number is

A) 12

B) 5

C) 8

D) 10

19- If log7 = 0.8451, then antilog(-1.1549) =

A) 0.07

B) 0.05

C) 0.02

D) 0.04

20- In a library, the ratio of number of story books to that of non-story books was 4:5 and total number of story books was 488. When some more story books were bought, the ratio became 6:5. What is the number of story books bought?

A) 262

B) 312

C) 244

D) 308

21- If $f : R \rightarrow R$ such that $f(x) = 7x + 3$, then $f^{-1}(x) =$

A) (x-3)/7

B) (x - 7)/3

C) 7x - 3

D) 1/(7x + 3)

22- A container contains a mixture of 49 litres of wine and water in the proportion of 5:2. How much of water must be added to it so as to make the ratio of wine to

water 7:4?

A) 6 litres

B) 4 litres

C) 7 litres

D) 5 litres

23- Which of the following statements is incorrect?

A) In a parallelogram, the diagonals bisect each other.

B) In a parallelogram, the diagonals are equal.

C) If all the sides of a quadrilateral are equal, then it is a parallelogram.

D) If all the angles of a quadrilateral are equal, then it is a parallelogram.

24- If tan $4\theta = \cot(\theta - 5°)$, where 4θ and $(\theta - 5°)$ are acute angles then the value of θ in degrees is

A) 19°

B) 18°

C) 20°

D) 16°

25- In a $\triangle ABC$, P, Q and R are the mid-points of AB, BC and CA respectively. If The length of the sides AB, BC and CA are 9 cm, 10 cm and 11 cm respectively, then the perimeter of

the $\triangle PQR$ is

A) 25 cm

B) 30 cm

C) 15 cm

D) 10 cm

26- Which of the following is an irrational number?

A) 0.0100100001….

B) 0.01

C) 0.3333333..

D) 0.12121212

27- The value of sin15˚ + cos15˚ is

A)$\frac{1}{\sqrt{2}}$

B)   1

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

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

28- If one root of the equation x² + px + 40 = 0 is 5, while the equation x² + px + q = 0 has equal roots, then the value of q is

A) 169

B)$\frac{4}{169}$

C) 4

D)$\frac{169}{4}$

29- *The domain of the function* $f(x) = \dfrac{3x^{\frac{5}{4}} + 3x^2 - 5}{x^2 - 16}$ *is*
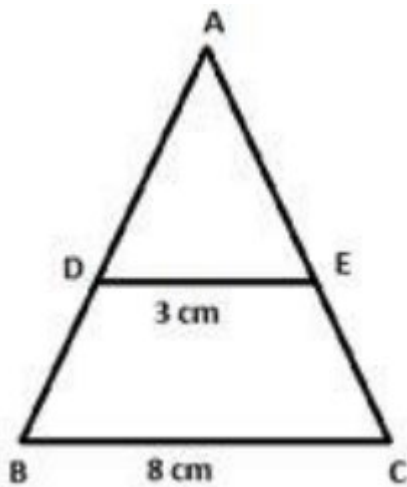
A) [0,4) U (4, ∞)

B) (-4, 4)

C) R - {4}

D) (-∞, ∞)

30- In the given figure, ABC is a triangle in which DE ∥ BC. If BC = 8 cm, DE = 3 cm and area of ΔADE = 27 cm², what is the area of ΔABC?

A) 64 cm²

B) 125 cm²

C) 192 cm²

D) 512 cm²

31- If $\dfrac{x^{1602} + 6x^{1601}}{4x^{1600}} = 2398.75$, then the positive value of x is

A) 98

B) 95

C) 101

D) 103

32- The value of the expression log(75/16)-3log(5/3)+log(160/81) is

A) log2

B) log3

C) log5

D) 1

33- If x = asinθ + bcosθ and y = acosθ - bsinθ, then which of the following is correct?

A) $x^2 + y^2 = a^2 + b^2$

B) $x^2 - y^2 = a^2 + b^2$

C) $x^2 - y^2 = a^2 - b^2$

D) $x^2 + y^2 = a^2 - b^2$

34- *If* $10^{0.33} = x$, $10^{0.60} = y$ and $x^z = y^3$, *then the value of z is approximately*

A) 2.76

B) 1.56

C) 5.45

D) 4.35

35- If x, y, z ∈ R and independent of each other, then the range of

$$\left(x^2 + \frac{1}{x^2}\right) + (5^y + 5^{-y}) + (\tan^2 z + \cot^2 z) \text{ is}$$

A) [6, ∞)

B) (- ∞, ∞)

C) (- ∞, 6]

D) [2, ∞)

If $\log_3(25 - x^2) = 2$,

36- then the value of x is

A) ±4

B) 1

C) ±3

D) 2

37- The angle of elevation of the top of a tower PR from a point Q on the ground is 30˚. If the observer moves 20 metres towards the foot of the tower to a point S, the angle of elevation of the top increases by 30˚. The height of the tower PR is

A) 16 m

B) 17.32 m

C) 15.41 m

D) 18 m

9 Oct 2021 3rd Shift

38- The digits of a two-digit number are in the ratio of 2 : 3 and the number obtained by interchanging the digits is bigger than the original number by 18. What is the original number?

A) 46

B) 69

C) 96

D) 64

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