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THE ASSOCIATION OF MATHEMATICS TEACHERS OF INDIA

Screening Test - Bhaskara Contest

*(NMTC- at **JUNIOR LEVEL** IX & X Standards)*

Saturday, 22nd August 2015.

Note:

1) *Fill in the response sheet with your Name, Class, the institution through which you appear in the specified places.*
2) *Diagrams are only visual aids; they are <u>not</u> drawn to scale.*
3) *You are free to do rough work on separate sheets.*
4) *Duration of the test: 2 p.m. to 4. p.m.- 2 hours.*

PART – A

Note:

- *Only one of the choices A,B,C,D is correct for each question. Shade that alphabet of your choice in the response sheet. (If you have any doubt in the method of answering, seek the guidance of your supervisor).*
- *For each correct response you get 1 mark; **for each incorrect response you lose ½ mark.***

1. The number of real solutions x of the equation $\sqrt[3]{x-1}+\sqrt[3]{x-3}+\sqrt[3]{x-5}=0$ is.

   a) 0 b) 1 c) 2 d) 3

2. A merchant has 100kg sugar, part of which he sells at 7% profit and the rest at 17% profit. He gains 10% on the whole. The amount of sugar (in kg) he sold at 7% profit is

   a) 60 b) 50 c) 80 d) 70

3. Mahadeven was asked what is $\frac{16}{17}$ of a certain fraction. By mistake he divided the fraction by $\frac{16}{17}$ and got an answer, which exceeds the correct answer by $\frac{33}{340}$. The correct answer is

   a) $\frac{60}{87}$ b) $\frac{62}{85}$ c) $\frac{64}{85}$ d) $\frac{67}{85}$

4. When $a=2015$ and $b=2016$, value of $\frac{a\sqrt{a}+b\sqrt{b}}{\left(\sqrt{a}+\sqrt{b}\right)(a-b)}+\frac{2\sqrt{b}}{\sqrt{a}+\sqrt{b}}-\frac{\sqrt{ab}}{a-b}$

   a) 0 b) 1 c) $(2015)^2$ d) $\sqrt{2016}$

5. An arithmetical progression has positive terms. The ratio of the difference of the 4th and 8th term to the 15th term is $\frac{4}{15}$ and the square of the difference of the 4th and the 1st term is 225. Which term of the series is 2015?

   a) 225 b) 404 c) 403 d) 410

6. The number of values of x which satisfy the equation $5^2.\sqrt[x]{8^{x-1}}=500$ is

   a) 1 b) 2 c) 3 d) 0

7. A number when divided by 899 gives a remainder 63. The remainder when this number is divided by 29 is

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

8. A train leaves a station 1 hour before the scheduled time. The driver decreases the speed by 4 km/h. At the next station 120km away, the train reached on scheduled time. The original speed of the train is (in km/h

a) 24 b) 36 c) 18 d) 22

9. $ABCD$ is a square. From the diagonal BD, a length BX is cut off equal to BA. From X, a straight line XY is drawn perpendicular to BD to meet AD at Y. Then $AB + AY =$

a) $\sqrt{2}BD$ b) $\frac{BD}{\sqrt{2}}$ c) $\sqrt{3}BD$ d) BD

10. The number of natural number pairs (x, y) in which $x > y$ and $\frac{5}{x}+\frac{6}{y}=1$ is

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

11. AB and AC are tangents at B and C to a circle. D is the mid point of the minor arc BC with respect to the triangle ABC, D is the

a) orthocenter b) circumcentre c) incentre d) centroid

12. Two circles of radii in the ratio 1:2 touch each other externally. The centre of the small circle is C and that of the big is D. The point of contact is A. PAQ is a straight line where P is on the smaller circle and Q on the on the bigger circle (PAQ doesnot pass through C). The angle between the tangent at Q to the bigger circle and the diameter (produced if necessary) of the smaller circle is

a) 60^0 b) 75^0 c) 80^0 d) none of these

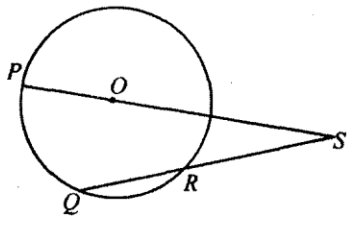
13. The number of real solutions of the equation $\frac{|x-3|-|x+1|}{2|x+1|}=1$ is

a) 0 b) 1 c) 2 d) 3

14. The number of real x which satisfies the equal by $\frac{8^x+27^x}{12^x+18^x}=\frac{7}{6}$ is

a) 2 b) 3 c) 4 d) 0

15. P, Q, R are there points on a circle of centre O. If RS = radius of the circle and $\angle PSQ = 12^0$, then $\angle POQ =$



a) 36^0 b) 42^0 c) 48^0 d) 54^0

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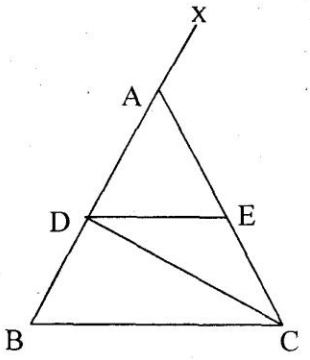
21. In the adjoining figure $AB = AC$. The exterior angle $CAX = 140^\circ$ D is the point on AB such that $CB = CD$. DE is drawn parallel to BC to meet AC at E. The measure of the $\angle DCE$ is _____



22. m, n are natural numbers. If $(m-8)(m-10) = 2^n$, the number of pairs (m, n) is _____

23. If $f(x) = \log\left(\frac{1+x}{1-x}\right)$ for -1 < x < 1 and it is found that $f\left(\frac{3x+x^3}{1+3x^2}\right) = K\, f(x)$, then the value of K is_____

24. If a, b, c, d are positive integers such that $a^5 = b^4$, $c^3 = d^2$ and c-a = 19, then the numerical value of $d - b$ is _____ (you can express in powers of numbers)

25. The contents of two vessels containing water and milk in the ratio 1: 2 and 2: 5 are mixed in the ratio 1: 4 The resulting mixture will have water and milk in the ratio _____

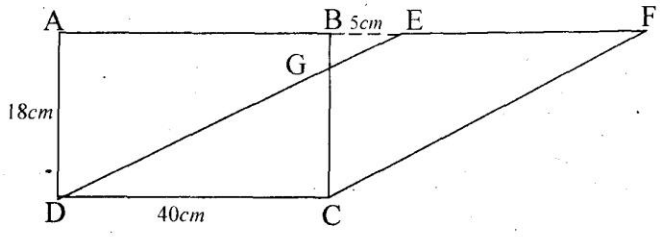
26. n = 560560560560563. Saket divided n^2 by 8. He will get a remaindér _____

27. The least positive integer by which 396 be multiplied to make a perfect cube is _____

28. The value of $\sqrt[3]{\frac{1.2.4 + 2.4.8 + ... + n.2n.4n}{1.3.9 + 2.6.18 + ... + n.3n.9n}}$ is _____

29. n is a natural number. It is given that $(n+20) + (n+21) + ... + (n+100)$ is a perfect square. Then the least value of n is _____

30. $ABCD$ is a rectangle $DEFC$ is a parallelogram. $ABEF$ is a straight line. Area of the quadrilateral $CGEF$ is _____



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