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THE ASSOCIATION OF MATHEMATICS TEACHERS OF INDIA

Screening Test - Kaprekar Contest

(NMTC- at ***SUB-JUNIOR LEVEL*** *VII & VIII 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 not 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 ratio of the angles of a quadrilateral are 7 : 9 : 10 : 10. Then
   a) One angle of the quadrilateral is greater than 120^0
   b) Only one angle of the quadrilateral is 90^0
   c) The sum of some two angles of the quadrilateral is 100^0
   d) There are exactly two right angles as interior angles.

2. Three different integers have a sum 1 and product 36. then
   a) Certainly all of them are positive
   b) Only one is negative
   c) Exactly two of them are negative
   d) All the three are negative.

3. The value of $\underbrace{2^{2015}+2^{2015}+..........+2^{2015}}_{256\ terms}$ divided by 2^{2015} is
   a) 256 b) 2^{73} c) 2^{2015} d) 2015

4. * is an operation defined as $a*b=\dfrac{ab+ba}{a+b}$ where a,b are natural numbers.
   (Ex: a=155, b=60 then $a*b=\dfrac{15560+60155}{155+60}$). If a=2015, b=5 then $a*b$ lies between
   a) 49 and 50 b) 50 and 51 c) 51 and 52 d) 53 and 54

5. The 2015th letter of the sequence *ABCDEDCBABCDEDCBA* ….. is
   a) *A* b) *B* c) *C* d) *E*

6. n is a natural number. The number of possible remainders of n^2 when divided by 7 is

a) 2 b) 3 c) 4 d) 5

7. The ratio of two natural numbers is 7:9. If each number is decreased by 2, the ratio becomes 3:4. The sum of the two numbers is

a) 23 b) 32 c) 48 d) 12

8. The speed of two runners are respectively 15km/hr and 16 km/hr. To cover a distance d km one takes 16 minutes more that the other. Then d = (in kilometres)

a) 32 b) 48 c) 64 d) 128

9. In the sum 3 + 33 + 333 + 3333 + ... 2015 terms the number formed by taking the last four digits in that order is

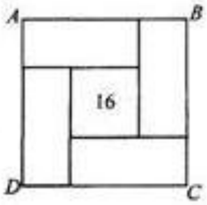
a) 6365 b) 6255 c) 6465 d) 6565

10. a% of the quantity P is added to P. To the increased quantity b% of the increased quantity is added. C% of the result is added to the result and the final quantity is Q. Then P is

a) $\frac{Q\times100\times100\times100}{(a+b+c)}$ b) $\frac{Q}{100a+100b+100c}$

c) $\frac{Q\times100\times100\times100}{(100+a)+(100+b)+(100+c)}$ d) $\frac{Q\times100\times100\times100}{(100-a)+(100+b)+(100+c)}$

11. $ABCD$ is a square of area 64cm². The centre square has are 16cm². The remaining are four congruent rectangles. The ratio of the length to breadth of a rectangle is

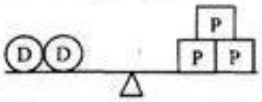


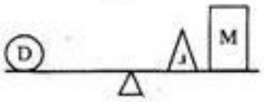
a) 2 b) 3 c) 4 d) 5

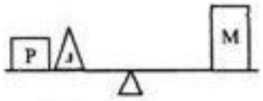
12. If $3^a+3^b=756$, $7^a+2^c=375$ and $5^a+3=128$, then the value of $a+b+c$ is

a) 12 b) 14 c) 18 d) 20

13. There are four types of dolls called *Dingle* (D), *Pingle* (P), *Jingle* (J) and *Mungle* (M). All toys of same category have same weight. No two toys of different category have some weight. They balance as shown.
How many Jingles will balance one *Mungle*?







a) 2 b) 3 c) 4 d) 5

14. A student has to score 30% marks to get through in an examination. If he gets 30 marks and fails by 30 marks the maximum marks set for the examination is

a) 90 b) 200 c) 250 d) 125

15. a,b,c,d are real numbers such that $1015 \le a \le 2015$, $3015 \le b \le 4015$, $5015 \le c \le 6015$ and $7015 \le d \le 8015$. The maximum value of $\frac{c+d}{a+b}$ is

a) $\frac{1403}{403}$ b) $\frac{1402}{403}$ c) $\frac{1401}{403}$ d) 2015

16. A black and white photograph is 70% black and 30% white. It is enlarged three times. The percentage of white in the enlargement is

a) 90% b) $66\frac{2}{3}\%$ c) $33\frac{1}{2}\%$ d) 30 %

17. The units digit of a 4 digit number $(5+1)(5^2+1)(5^3+1)\,..........\,(5^{2015}+1)$ is

a) 9 b) 8 c) 6 d) 4

18. If the product of the digits of a 4-digits number is 75, the sum of the digits of the number is

a) 12 b) 13 c) 14 d) 15

19. The hypotenuse 'c' and one side 'a' of a right triangle are consecutive integers. The square of the third side is

a) $c-a$ b) ca c) $c+a$ d) $\frac{c}{a}$

20. The fraction $\frac{2121212121210}{1121212121211}$ when reduced to its simplest form is

a) $\frac{73}{70}$ b) $\frac{37}{7}$ c) $\frac{70}{37}$ d) $\frac{70}{13}$

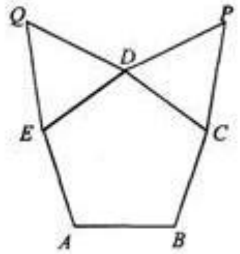
PART – B

Note:

- *Write the correct answer in the space provided in the response sheet.*
- *For each correct response you get I mark;* ***for each incorrect response you lose ¼ mark.***

21. The number of numbers in the list 1,2,3,4, ... 2015 which are perfect squares and also perfect cubes is ___________.

22. *ABCDE* is a regular pentagon. *CDP* and *EDQ* are equilateral triangles. The measure of $\angle QDP$ is __________.



23. The value of $1 - 2 + 3 - 4 + 5 - \ldots\ldots\ldots\ldots + 2015$ is _____________.

24. Using the digits of the number 2015, four digit numbers of different digits are formed. The number of such numbers greater than 2000 and less than 6000 is __________.

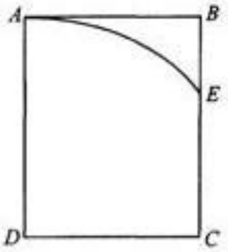
25. *Samrud* got an average mark 85 in his first 8 tests and an average 81 for the first 9 tests. His mark in the 9th test is ________.

26. The remainder when 2015002015000201500 2015 is divided by 3 is ___________.

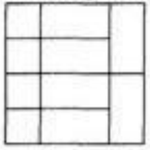
27. If $\dfrac{p}{q} = 1 + \cfrac{1}{2 + \cfrac{1}{3 + \cfrac{1}{4 + \cfrac{1}{5}}}}$ where *p*, *q* have no common factors then $p + q =$ __________.

28. If $\dfrac{p}{q} = 1 + \cfrac{5}{1 + \cfrac{4}{1 + \cfrac{3}{1 + \cfrac{1}{2}}}}$ where *p*, *q* have no common factors, then $p + q =$ _________.

29. In the adjoining figure, *ABCD* is a rectangle. $AD = 2$, $AB=1$, *AE* is the arc of the circle centred *D*. The length *BE* is equal to _____________.



30. In the adjoining figure, we have 1cm^2 square and 2cm^2 rectangles. The number of squares with different dimensions found in the figure is



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