THE ASSOCIATION OF MATHEMATICS TEACHERS OF INDIA

Screening Test – Kaprekar Contest

NMTC at SUB JUNIOR LEVEL – VII & VIII Standards

Saturday, 1st September 2018

Note:

1. Fill in the response sheet with your Name, Class and 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 pm to 4 pm – 2 hours.

PART – A

Note

- Only one of the choices A, B, C, D is correct for each question. Shade the alphabet of your choice in the response sheet. If you have any doubt in the method of answering, seek the guidance of the supervisor.
- For each correct response you get 1 mark. **For each incorrect response you lose $\frac{1}{2}$ mark.**

1. The fraction greater than $8\frac{4}{9}$ is
   A. $8\frac{1}{3}$ B. $\frac{150}{18}$ C. $8\frac{2}{3}$ D. $\frac{216}{27}$

2. A car is slowly driven in a road full of fog. The car passes a man who was walking at the rate of 3 km an hour in the same direction. He could see the car for 4 minutes and was visible for up to a distance of 100 meters. The speed of the car is (in km per hour)
   A. $4\frac{1}{2}$ B. 4 C. $3\frac{1}{2}$ D. 3

3. Kiran sells pens at a profit of 20% for Rs 60. But due to lack of demand he reduced its price to Rs 55. Then
   A. he gets a profit of 10% B. he gets a profit of 12% C. he incurs a loss of 10%
   D. he incurs a loss of 8%

4. If 40% of a number is added to another number then it becomes 125% of itself. The ratio of the second to the first number is
   A. 5 : 8 B. 7 : 5 C. 8 : 5 D. None of these

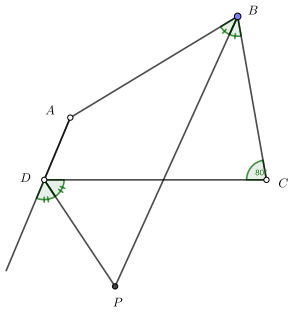
5. The length of a rectangular sheet of paper is 33 cm. It is rolled along its length into a cylinder so that its width becomes height of the cylinder. The volume is 1386 cubic cms. The width of the rectangular sheet (in cm) is
   A. 14 B. 15 C. 16 D. 18

6. If
$$\frac{1}{1\times 2}+\frac{1}{2\times 3}+\cdots+\frac{1}{n\times(n+1)}=\frac{19}{20}$$
then $n=$
A. 18 B. 19 C. 20 D. 25

7. a, b are natural numbers. If $9a^2=12a+96$ and $b^2=2b+3$, the value of $2018(a+b)$ is
A. 14226 B. 14128 C. 14126 D. 14246

8. Shanti has three daughters. The average age of them is 15 years. Their ages are in the ratio $3:5:7$. The age of the youngest daughter is (in years)
A. 8 B. 9 C. 10 D. 12

9. In the adjoining figure, $ABCD$ is a quadrilateral. The bisectors of $\angle B$ and the exterior angle at D meet at P. Given $\angle C=80^\circ, \angle ADC=\frac{1}{2}\angle A$ and $\angle A=\angle C+40^\circ$. Then $\angle DPB$ is
A. 50° B. 60° C. 70°
D. 80°



10. The number of 3-digit numbers which contain 6 and 7 is
A. 52 B. 60 C. 62 D. 64

11. The difference between the biggest and the smallest three digit numbers each of which has different digits is
A. 864 B. 875 C. 885 D. 895

12. If $3x+1=2y-1=5z+3=7w+1=15$, the value of $6x-3y+5z-8w$ is
A. 1 B. 2 C. 3 D. None of these

13. Five years ago the average age of Aruna, Roy, David and Salman is 45 years. Sita joins them now. The average age of all the five now is 49 years. The present age of Sita is (in years)
A. 45 B. 43 C. 51 D. 48

14. The fraction $\frac{B}{3x-1}$ is subtracted from the fraction $\frac{A}{2x+3}$. The resulting fraction is $\frac{-11}{(2x+3)(3x-1)}$. Then $A+B=$
A. 11 B. -11 C. 5 D. -5

15. There are some cows and ducks. The total number of legs is equal to 14 more than twice the number of heads. The number of cows is
A. 5 B. 6 C. 7 D. 8

16. The sum of 5% of a number and 9% of another number is equal to sum of the 8% first number and 7% of the second number. The ratio between the numbers is
A. 3 : 2 B. 5 : 7 C. 7 : 9 D. 2 : 3

17. The length of two sides of an isosceles triangle are 8 cm and 14 cm. The perimeter of the triangle (in cm) is
A. 30 B. 36 C. 19 D. 30 or 36

18. There are three cell phones A, B, C. A is 50% costlier than C and B is 25% costlier than C. A is $a\,\%$ costlier than B. Then $a =$
A. 25 B. 20 C. 15 D. 10

19. Sushant wrote a two digit number. He added 5 to the tens digit and subtracted 3 from the unit digit of the number and got a number equal to twice the original number. The original number is
A. 47 B. 74 C. 37 D. 73

20. The units digit of $5^{2018} - 3^{2018}$ is
A. 5 B. 6 C. 7 D. 4

PART – B

Note

- Write the correct answer in the space provided in the response sheet.
- For each correct response you get 1 mark. **For each incorrect response you lose $\frac{1}{4}$ mark.**

21. The smallest natural number that has to be added to 803642 to get a number which is divisible by 9 is ———

22. The greatest two digit number that will divides 398, 436 and 542 leaving respectively 7, 11 and 15 as remainders is ———

23. $\frac{2}{3}$ is ——— *of* $\frac{1}{3}$.

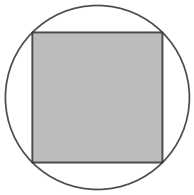
24. The sum of 5 positive integers is 280. The average of the first 2 numbers is 40. The average of the third and fourth number is 60. The fifth number is ———

25. If $a : b = 3 : 4$ and $\frac{p}{q} = \frac{a^2 + b^2 + ab}{a^2 + b^2 - ab}$, where p, q have no common divisors other than 1, $p + q$ is ———

26. a is a natural number such that a has exactly two divisors and $(a+1)$ has exactly three divisors. The number of divisors of $a + 2$ is ———

27. The first term of a series is $\frac{2}{5}$. If x is a term of this series, the next term is $\frac{1-x}{1+x}$. If t_n denotes the n-th term and $t_{2018} - t_{2017} = \frac{p}{q}$, where p, q are integers having no common factors other than 1, $p + q$ is ———

28. In the adjoining figure, the side of the square is $\sqrt{\frac{2018}{\pi}}$ cm. The area of the unshaded region is $\left(\frac{\pi-2}{\pi}\right)A$ sq cms. The value of A is ———



29. n is a natural number. The square root of the sum of the square of n and 19 is equal to the next natural number to n. The value of n is ———

30. Using only the digits 1, 2, 4, 5, two-digit numbers are formed. The digits of the two digit number may be the same or different. The number of such two-digit number is ———