2-10M   **Virudhunagar District Common Examinations**
                  Common Second Revision Test - February 2020

hunagar District   - - - - -   LS
                              Standard 10

Time: 3.00 Hrs.   **MATHS**   Marks: 100

PART - I

Note: I) Answer all the 14 questions.   14×1=14
      ii) Choose the most suitable answer from the given four alternatives and write
          the option code with the corresponding answer.

1) If f is an identity function, then the value of f(1)−2f(2)+f(3)
   1) 1   2) 0   3) −1   4) −3

2) If there are 1024 relations from a set A = {1, 2, 3, 4, 5} to a set B, then the
   number of elements of B is
   1) 3   2) 2   3) 4   4) 8

3) Find the remainder when the difference of 60002 and 601 is divisible by 6
   1) 2   2) 1   3) 0   4) 3

4) The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}$ ....

   1) $\frac{1}{24}$ 2) $\frac{1}{27}$ 3) $\frac{2}{3}$ 4) $\frac{1}{81}$

5) $y^2 + \frac{1}{y^2}$ - is not equal to

   1) $\frac{y^4+1}{y^2}$ 2) $\left(y+\frac{1}{y}\right)^2$ 3) $\left(y-\frac{1}{y}\right)^2+2$ 4) $\left(y+\frac{1}{y}\right)^2-2$

6) If the roots of an equation $ax^2+bx+c = 0$ are equal, then the value of b is
   1) $\pm\sqrt{ac}$ 2) $\pm 2\sqrt{ac}$ 3) $\sqrt{ac}$ 4) b^2-4ac

7) If ΔABC is an isosceles triangle with ∠C = 90° and AC = 5 cm, then AB is
   1) 2.5 cm   2) 5 cm   3) 10 cm   4) $5\sqrt{2}$ cm

8) A tangent is perpendicular to the radius at the
   1) centre   2) point of contact   3) infinity   4) chord

9) If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then the slope of the perpendicular bisector of PQ is

   1) $\sqrt{3}$ 2) $-\sqrt{3}$ 3) $\frac{1}{\sqrt{3}}$ 4) 0

10) The area of the triangle whose vertices are (a, b+c), (b, c+a) and (c, a+b) is
    1) $(a+b+c)^2$ 2) 0   3) a+b+c   4) abc

11) The angle of elevation of a cloud from a point h metres above a lake is β. The angle
    of depression of its reflection in the lake is 45°. The height of location of the
    cloud from the lake is
    1) $\frac{h(1+\tan\beta)}{1-\tan\beta}$ 2) $\frac{h(1-\tan\beta)}{1+\tan\beta}$ 3) htan(45°−β)   4) None of these

12) If the ratio of the height of a tower and the length of its shadow is $1:\sqrt{3}$, then
    the angle of elevation of the sun has measure
    1) 45°   2) 30°   3) 90°   4) 60°

13) In a hollow cylinder, the sum of the external and internal radii is 14 cm and the
    width is 4 cm. If its height is 20 cm, the volume of the material in it is
    1) 5600π cu.cm   2) 1120π cu.cm   3) 56π cu.cm   4) 3600π cu.cm

14) The mean of 100 observations is 40 and their standard deviations is 3. The sum
    of squares of all deviations is
    1) 40000   2) 160900   3) 160000   4) 30000

PART - II

Note: I) Answer 10 questions.   II) Question Number 28 is compulsory.   10×2=20

15) Define: Null relation

16) If f : N→N is a function defined by f(m) = m²+m+3, then show that it is one-one.

17) Solve: 8x ≡ 1(mod 11)

18) If 3+k, 18−k, 5k+1 are in A.P, then find k.

19) A man goes 18m due east and then 24m due north. Find the distance of his
    current position from the starting point?

20) The slope of the line joining the points (−2, a) and (9, 3) is −1/2. Find a.

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21) A mobile phone is put to use when the battery power is 100%. The percent of battery power "y" remaining after using the mobile phone for the hours is assumed as $y = -0.25x + 1$. How much time does it taken so that the battery has no power?

22) Prove that: $\dfrac{1 + \sec A}{\sec A} = \dfrac{\sin^2 A}{1 - \cos A}$

23) From the top of a rock $50\sqrt{3}$ m high, the angle of depression of a car on the ground is observed to be 30°. Find the distance of the car from the rock.

24) A hemispherical section is cut out from one face of a cubical wooden block such that the diameter the diameter 'l' of the hemisphere is equal to the edge of the cube. Determine the curved surface area of the remaining solid.

25) The radius of a sphere increases by 25%. Find the percentage increase in its surface area.

26) If the mean and the co-efficient of variation of a data are 15 and 48 respectively, then find the value of standard deviation.

27) In a two children family, find the probability that there is at least one girl in a family.

28) If $A = \begin{pmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{pmatrix}$, $B = \begin{pmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{pmatrix}$ then find B-5A.

PART - III

Note: i) Answer 10 questions. ii) Question Number 42 is compulsory.   10×5=50

29) A function $f : [-5, 9] \to R$ is defined as follows $f(x) = \begin{cases} 6x + 1, & -5 \le x < 2 \\ 5x^2 - 1, & 2 \le x < 6 \\ 3x - 4, & 6 \le x \le 9 \end{cases}$

Find: (i) $f(-3) + f(2)$ (ii) $f(7) - f(1)$ (iii) $2f(4) + f(8)$ (iv) $\dfrac{2f(-2) - f(6)}{f(4) + f(-2)}$

30) In an A.P, sum of four consecutive terms is 28 and their sum of their squares is 276. Find the four numbers.

31) How many terms of series $1^3 + 2^3 + 3^3 + \ldots$ should be taken to get the sum 14400?

32) Find the square root of: $121x^4 - 198x^3 - 183x^2 + 216x + 144$

33) If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ then prove that $A^2 - 5A + 7I_2 = 0$.

34) State and prove alternate segment theorem.

35) Find the GCD of the polynomials $3x^4 + 6x^3 - 12x^2 - 24x$ and $4x^4 + 14x^3 + 8x^2 - 8x$.

36) A line makes positive intercepts on co-ordinate axes where sum is 7 and it passes through (-3, 8). Find its equation.

37) Find the equation of a straight line parallel to y-axis and passing through the point of intersection of the lines $4x + 5y = 13$ and $x - 8y + 9 = 0$.

38) To a man standing outside his house, the angles of elevation of the top and bottom of a window are 60° and 45° respectively. If the height of the man is 180 cm and if he is 5m away from the wall, what is the height of the window? $\left(\sqrt{3} = 1.732\right)$

39) From a solid cylinder whose height is 2.4 cm and the diameter 1.4 cm, a cone of the same height and same diameter is carved out. Find the volume of the remaining solid to the nearest cm^3.

40) Find the mean and variance of the first 'n' natural numbers.

41) A coin is tossed thrice. Find the probability of getting exactly two heads or at least one tail or two consecutive heads.

42) Let A = {1, 2, 3, 4} and B = {2, 5, 8, 11, 14} be two sets. Let $f : A \to B$ be a function given by $f(x) = 3x - 1$. Represent this function (i) as a set of ordered pairs (ii) a table (iii) by arrow diagram (iv) a graph.

PART - IV

Note: i) This section contains two questions. Each with two alternatives.   2×8=16
ii) Answer both the questions choosing either of the alternatives.

43) A) Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point.

(OR)

B) Construct a ΔPQR which the base PQ = 4.5 cm, ∠R = 35° and the median from R to RG is 6 cm.

44) A) Discuss the nature of solutions of the quadratic equation graphically $x^2 + x + 7 = 0$.

(OR)

B) Draw the graph of $y = x^2 - 4$ and hence solve $x^2 - x - 12 = 0$.