Tirunelveli District LS

T TIRUNELVELI

SECOND REVISION TEST, FEBRUARY - 2020

STANDARD - X

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Time : 3.00 hrs **MATHS** **Marks: 100**

Part - I

Note: i) Answer all the 14 questions. ii) Choose the most suitable answer from the given the four alternatives and write the option code with the corresponding answer. iii) Each question carries 1 mark. **14×1=14**

1) If {(a, 8), (6,b)} represents an identity function, then the value of a and b are respectively.
   a) (8,6) b) (8, 8) c) (6, 8) d) (6, 6)

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

3) If 6 times of 6th term of an A.P is equal to 7 times the 7^{th} term, then the 13^{th} term of the A.P is
   a) 0 b) 6 c) 7 d) 13

4) The value of $(1^3+2^3+3^3+.....+15^3) - (1+2+3+.....+15)$ is
   a) 14400 b) 14200 c) 14280 d) 14520

5) If r(x)=0 when f(x) is divided by g(x) then g(x) is called _____ of the polynomials.
   a) Dividend b) quotient c) remainder d) G.C.D

6) Find the matrix x if $2x + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$
   a) $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$ b) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ c) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ d) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$

7) If ΔABC is an isoceles triangle with $\angle C=90^\circ$ and AC=5cm, then AB is
   a) 2.5cm b) 5cm c) 10cm d) $5\sqrt{2}$cm

8) The area of triangle formed by the points (-5,0), (0,-5) and (5,0) is
   a) 0 sq.units b) 25 sq.units c) 5 sq.units d) none of these

9) If $5x=\sec\theta$ and $\frac{5}{x}=\tan\theta$, then $x^2-\frac{1}{x^2}$ is equal to
   a) $\frac{1}{25}$ b) $\frac{1}{125}$ c) $\frac{1}{5}$ d) 1

10) The angle of elevation _____ as we move towards the foot of the vertical object (tower)
a) increase b) decrease c) unchanged d) none of these

11) The point of intersection of $3x-y=4$ and $x+y=8$ is
a) (5, 3) b) (2, 4) c) (3, 5) d) (4, 4)

12) A shuttle cock used for playing badminton has the shape of the combination of
a) a cylinder and a sphere b) a hemisphere and a cone
c) a sphere and a cone d) frustum of a cone and a hemisphere

13) If the sum and mean of a data are 407 and 11 respectively, then the number of observations in the data are ____
a) 33 b) 35 c) 37 d) 39

14) A page is selected at random from a book. The probability that the digit at units place of the page number chosen is less than 7 is
a) $\frac{3}{10}$ b) $\frac{7}{10}$ c) $\frac{3}{9}$ d) $\frac{7}{9}$

Part - III

Note: i) Answer any Ten questions only. Question number 28 is compulsory:
ii) Each question carries Two marks:- / **10×2=20**

15) Define a function.

16) A function f is defined by $f(x)=3-2x$. Find x such that $f(x^2)=(f(x))^2$.

17) Compute x, such that $10^4 \equiv x \pmod{19}$

18) In a G.P. 729, 243, 81, ... find t_7.

19) Simplify:- $\frac{x^3}{x-y} + \frac{y^3}{y-x}$

20) If α, β are the roots of the equation $3x^2+7x-2=0$ find the value of $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$

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

22) Find the slope and y intercept of $\sqrt{3}x+(i-\sqrt{3})y=3$

23) If the straight lines $12y=-(p+3)x+12$, $12x-7y=16$ are perpendicular then find 'p'.

24) Prove that $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = \sec\theta+\tan\theta$

25) The radius of a spherical balloon increases from 12cm to 16cm as air being pumped into it. Find the ratio of the surface area of the balloons in the two cases.

26) Find the maximum volume of a cone that can be carved out of a solid hemisphere of radius r units.

27) A die is rolled and a coin is tossed simultaneously. Find the probability that the die shows an odd number and the coin shows a head.

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

Part - III

Note: I) Answer any Ten questions only. Question number 42 is compulsory.

II) Each question carries five marks:- **10×5=50**

29) Let A= The set of all natural numbers less than 8, B=The set of all prime numbers less than 8, C=The set of even prime numbers. Verify that
i) $(A \cap B) \times C = (A \times C) \cap (B \times C)$ ii) $A \times (B - C) = (A \times B) - (A \times C)$.

30) Find the value of k, such that fog=gof f(x)=3x+2, g(x)=6x–k

31) Find the square root of the expression $\frac{4x^2}{y^2} + \frac{20x}{y} + 13 - \frac{30y}{x} + \frac{9y^2}{x^2}$

32) Rekha has 15 square colour papers of sixes 10cm, 11cm, 12cm .....24cm. How many area can be decorated with these colour papers?

33) Find the sum of all natural numbers between 300 and 600 which are divisible by 7.

34) P and Q are the mid-points of the sides CA and CB respectively of a ΔABC, the right angled at C. Prove that $4(AQ^2+BP^2) = 5AB^2$.

35) A bus covers a distance of 90km at a uniform speed. Had the speed been 15km/hour more it would have taken 30 minutes less for the journey. Find the original speed of the bus.

36) A (-3,0), B(10,-2) and C(12,3) are the vertices of ΔABC. Find the equation of the altitude through A and B.

37) A toy is in the shape of a cylinder surmounted by a hemisphere. The height of the toy is 25cm. Find the total surface area of the toy if its common diameter is 12cm.

38) Find the area of the triangle formed by the lines $3x+y-2=0$, $5x+2y-3=0$ and $2x-y-3=0$

39) A Remi-spherical hollow bowl has material of volume $\frac{436\pi}{3}$ cubic cm. Its external diameter is 14cm. Find its thickness.

40) The rainfall recorded in various places of five districts in a week are given below:-

Rainfall (in mm)	45	50	55	60	65	70
Number of places	5	13	4	9	5	4

Find its standard deviation.

41) A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card.

42) From a point on the ground, the angle of elevation of the bottom and top of a tower fixed at the top of a 30m high building are 45° and 60° respectively. Find the height of the tower. ($\sqrt{3}=1.732$)

Part - IV

Note: i) Answer both the questions. ii) Each question carries 8 marks. 2×8=16

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

b) Construct a ΔPQR such that QR=6.5cm, $\angle P=60°$ and the altitude from P to QR is of length 4.5cm.

44) a) Draw the graph of $y=x^2-4$ and hence solve $x^2-x-12=0$ **[or]**

b) Discuss the nature of solutions of the following quadratic equations $x^2-8x+16=0$

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