Time : 3 Hrs + 15 Minutes **Public Exam 2020 – Model Quesiton Paper** Date :

Class / Subject : X - MATHEMATICS Maximum Marks : 100

PART – A 14X1=14

Answer All The Questions :

1. The range of the relation $R = \{(x, x^2)/x \text{ is a prime number less than } 13\}$ is
   a) {2 3,5,7} b) {2,3,5,7,11} c) {4,9,25,49,121} d) {1,4,9,25,49,121}
2. If $g = \{(1,1), (2,3), (3,5), (4,7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the values of α and β
   a) $(-1,2)$ b) $(2,-1)$ c) $(-1,-2)$ d) $(1,2)$
3. The sequence $-3, -3, -3, \ldots$ is
   a) an A.P only b) a G.P. only c) neither A.P nor G.P d) both A.P and G.P
4. If $2 + 4 + 6 + \cdots + 2k = 90$, then the value of k is
   a) 8 b) 9 c) 10 d) 11
5. The LCM of $x^3 - a^3$ and $(x - a)^2$ is
   a) $(x^3 - a^3)(x + a)$ b) $(x^3 - a^3)(x - a)^2$ c) $(x - a)^2(x^2 + ax + a^2)$ d) $(x - a)^2(x^2 + ax + a^2)$
6. The solution of $x^2 - 25 = 0$ is
   a) No real root b) real and equal roots c) real and unequal roots d) imaginary roots
7. In a ΔABC , AD is the bisector of $\angle BAC$, If $AB = 8\ cm, Bd = 6\ cm$ and $DC = 3\ cm$, the length of the side AC is
   a) $6\ cm$ b) $4\ cm$ c) $3\ cm$ d) $8\ cm$
8. If $(5,7), (3,p)$ and $(6,6)$ are collinear, then the value of p is
   a) 3 b) 6 c) 9 d) 12
9. The equation of a line passing through the origin and perpendicular to the line $7x - 3y + 4 = 0$ is
   a) $7x - 3y += 0$ b) $3x - 7y + 4 = 0$ c) $3x + 7y = 0$ d) $7x - 3y = 0$
10. $\frac{\sin(90-\theta)\sin\theta}{\tan\theta} + \frac{\cos(90-\theta)\cos\theta}{\cot\theta} =$
    a) $\tan\theta$ b) 1 c) -1 d) $\sin\theta$
11. A spherical ball of radius $r_1$units is melted to make 8 new identical balls each of radius $r_2$units. Then $r_1 : r_2$ is
    a) 2 : 1 b) 1 : 2 c) 4 : 1 d) 1 : 4
12. If the volume of sphere is $36\pi cm^3$, then its radius is equal to
    a) $3\ cm$ b) $2\ cm$ c) $5\ cm$ d) $10\ cm$
13. The range of first 10 prime number is
    a) 9 b) 20 c) 27 d) 5
14. If a letter is chosen at random from the English alphabets, then the probability that the let chosen precedes x
    a) $\frac{12}{13}$ b) $\frac{1}{13}$ c) $\frac{23}{26}$ d) $\frac{3}{26}$

PART – B 10x2=20

Answer Any 10 Questions : (Q.No 28 is compulsory).

15. Let $A = \{1,2,3, \ldots 100\}$ and R be the relation defined as " is cube of " on A. Find the domain and range of R.
16. If $f(x) = x^2 - 1, g(x) = x - 2$, find "a" if $g \circ f(a) = 1$.

17 If $3+k, 18-k, 5k+1$ are in A P, then find k.

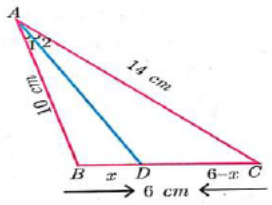
18. Find the sum of $1+3+5+\cdots+55$.

19. The product of Kumaran's age(in years) two years ago and four years from now is one more than twice his present age. What is his present age?

20. If the difference between a number and its reciprocal is $\frac{24}{5}$, find the number.

21. If $A=\begin{bmatrix}0 & 4 & 9\\ 8 & 3 & 7\end{bmatrix}$ and $\begin{bmatrix}7 & 3 & 8\\ 1 & 4 & 9\end{bmatrix}$, find the value of $3A-9B$.

22. In the figure, AD is the bisector of $\angle BAC$, if $AB=10cm, AC=14cm$, and $BC=6cm$. Find BD and DC.



23. Find the slope of a line joining the points $(\sin\theta, -\cos\theta)$ and $(-\sin\theta, \cos\theta)$.

24. Prove that $\frac{\cot A-\cos A}{\cot A+\cos A}=\frac{cosec\ A-1}{cosec\ A+1}$.

25 The volumes of two cones of same base radius are $3600cm^3$and $5040cm^3$ Find the ratio of the heights.

26. The mean of a data is 25.6 and its coefficient of variation is 18.75. Find the standard deviation.

27. A and B are two candidates seeking admission to IIT. The probability that A getting selected is 0.5 and the probability that both A and B getting selected is 0.3. Prove that the probability of B being selected is at most 0.8.

28 The line through the points $(-2,6)$ and $(4,8)$ is perpendicular to the line through the points $(8,12)$ and $(x,24)$. Find the value of x.

PART – C

10x5=50

Answer Any 10 Questions : (Q.No 42 is compulsory).

29. Let $A=\{x\in W/x<2\}, B=\{x\in N\ /\ 1<x\leq 4\}$ and $C=\{3,5\}$. Verify that $(A\cup B)\times C=(A\times C)\cup(B\times C)$

30. An object travels under the influence of gravity in time t seconds is given by $S(t)=\frac{1}{2}gt^2+at+b$. where (g is the acceleration due to gravity). a, b are the constants Check if the function $S(t)$ is one – one.

31. Find the sum of the geometric series $3+6+12+\cdots+1536$.

32. Rekha has 15 square colour papers of sizes $10cm, 11cm, 12cm, \ldots 24cm$. How much area can be decorated with these colour papers?

33. Solve the system of linear equations in three variables : $x+y+z=5\ , 2x-y+z=9\ , x-2y+3z=16$.

34. If the roots of the equation $(c^2-ab)x^2-2(a^2-bc)x+b^2-ac=0$ are real and equal. Prove that either $a=0$ or $a^3+b^3+c^3=3abc$.

35. If $A=\begin{pmatrix}1 & 1\\ -1 & 3\end{pmatrix}, B=\begin{pmatrix}1 & 2\\ -4 & 2\end{pmatrix}, C=\begin{pmatrix}-7 & 6\\ 3 & 2\end{pmatrix}$ verify that $A(B+C)=AB+AC$.

36. State and prove Pythagoras theorem.

37. Find the equation of a straight line joining the point of intersection of $3x+y+2=0$ and $x-2y-4=0$ to the point of intersection of $7x-3y=-12$ and $2y=x+3$.

38. 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.

39. A shuttle cock used for playing badminton has the shape of a frustum of a cone is mounted on a hemisphere. The diameter of the frustum are 5cm and 2cm. The height of the entire shuttle cock is 7cm. Find its external surface area.

40 A metallic sheet in the form of a sector of a circle of radius 21 cm has central angle of 216° The sector is made into a cone by bringing the bounding radii together. Find the volume of the cone formed.

41. Find the co-efficient of variation of the data 18,20,15,12,25.

42. A card is drawn from a pack of 52 cards. Find the probability of getting a Queen or a diamond or a black card.

PART – D **2x8=16**

Answer All The Questions :

43. a) Construct a ΔPQR in which $PQ = 8\ cm,\ \angle R = 60°$ and the median RG from R to PQ is 5 8 cm. Find the length of the altitude from R to PQ. **(OR)**

b) Draw a circle of diameter 6 cm from a point P, which is 8cm away from its centre. Draw the two tangents PA and PB to the circle and measure their lengths.

44. a) Draw the graph of $y = 2x^2 - 3x - 5$ and hence solve $2x^2 - 4x - 6 = 0$. **(OR)**

b) Draw the graph of $y = x^2 + x - 2$ and use it to solve $x^2 + x - 2 = 0$.

ALL THE BEST

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