Ramnad District LS

Second Revision Examination – 2020

Ramanathapuram District

Time: 15 Min + 3.00 Hrs. **X Standard – Mathematics** **Maximum Marks - 100**

PART– I (Marks - 14)

Note: i) Answer All the 14 questions

ii) Choose the most suitable answer from given the four alternatives and write the option code with the corresponding answers. **14 x 1 = 14**

1. If there are 512 relations from a set $A=\{1, 2, 3\}$ to a set B, then the number of elements in B is

a) 3 b) 2 c) 4 d) 8

2. If f is an identity function then the value of $f(2)+2f(3)-f(4)$

a) 2 b) 4 c) -6 d) 8

3. If the HCF of 65 and 117 is expressible in the form of $65m-117$, then the value of m is

a) 4 b) 2 c) 1 d) 3

4. Sum of the first n terms of the series $\sqrt{2}+\sqrt{8}+\sqrt{18}+\ldots$ is

a) 1 b) $\sqrt{n}$ c) $\frac{n(n+1)}{2}$ d) $\frac{n(n+1)}{\sqrt{2}}$

5. If A is a 2×3 and B is a 3×4 matrix, how many columns does AB have

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

6. If $\frac{p}{q}=a$ then $\frac{p^2+q^2}{p^2-q^2}=?$

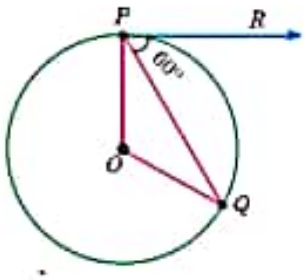
a) $\frac{1-a^2}{1+a^2}$ b) $\frac{1+a^2}{1-a^2}$ c) $\frac{a^2+1}{a^2-1}$ d) $\frac{a^2-1}{a^2+1}$

7. The quadratic equation $2x^2-\sqrt{5}x+1=0$ has

a) two distinct real roots b) two equal real roots

c) no real roots d) more than two real roots

8. In the figure if PR is tangent to the circle at P and O is the centre of the circle, then $\angle POQ$ is



a) 120^0 b) 100^0

c) 110^0 d) 90^0

9. The slope of the line which is perpendicular to a line joining the points $(0, 0)$ and $(-8, -8)$ is

a) -1 b) 1 c) $\frac{1}{3}$ d) -8

10. If $x = a\cos\theta$ and $y = b\sin\theta$ then

a) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ b) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ c) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ d) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 0$

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. A cone, a hemisphere and a cylinder stand on equal bases and have the same height, then their ratios of their volumes is

a) 1 : 2 : 3 b) 2 : 1 : 3 c) 1 : 3 : 2 d) 3 : 1 : 2

13. If a standard variation of a variable x is 4 and if $y = \frac{3x+5}{4}$, then the standard deviation of y is

a) 3.5 b) 4 c) 4.5 d) 3

14. The probability of getting a job for a person is $\frac{x}{3}$. If the probability of not getting the job is $\frac{2}{3}$, then the value of x is

a) 2 b) 1 c) 3 d) 1.5

PART – II (Marks - 20)

Note: Answer TEN questions. Question Number. 28 is compulsory. **10 x 2 = 20**

15. If $f(x) = 3x+2$, $g(x) = 6x-k$ and if $f \circ g = g \circ f$, then find the value of k

16. Kala and Vani are friends. Kala says, "Today is my birthday" and she asks Vani, "When will you celebrate your birthday?" Vani replies, "Today is Monday and I celebrated my birthday 75 days ago". Find the day when Vani celebrated her birthday.

17. If $1^3 + 2^3 + 3^3 + \ldots + k^3 = 3025$, then find the sum of the first k natural numbers.

18. Find the excluded values of the expressions $\frac{7p+2}{8p^2+13p+5}$

19. Find the square root of the expressions $256(x-a)^8(x-b)^4(x-c)^{16}(x-d)^{20}$

20. $A = \begin{pmatrix} \cos\theta & 0 \\ 0 & \cos\theta \end{pmatrix}$ and $B = \begin{pmatrix} \sin\theta & 0 \\ 0 & \sin\theta \end{pmatrix}$, then prove that $A^2 + B^2 = I$

21. PQ is a tangent drawn from a point P to a circle with centre O and QOR is a diameter of the circle such that $\angle POR = 120^0$. Find $\angle OPQ$.

22. If the area of the triangle formed by the vertices $A(-1, 2)$, $B(k, -2)$ and $C(7, 4)$ is 22 sq. units, Find the value of k

23. Find the angle of elevation of the top of the tower from a point on the ground, which is 30 m away from the foot of a tower of height $10\sqrt{3}$ m

24. Prove that $\sqrt{\frac{1+\sin A}{1-\sin A}}+\sqrt{\frac{1-\sin A}{1+\sin A}}=2\sec A$

25. Four persons live in a conical tent whose slant height is 19 cm. If each person require 22 sq.cm of the floor area, then find the height of the tent.

26. The mean and variance of a data are 12.5 and 42.25 respectively. Find the coefficient of variation.

27. A number taken randomly from the series 1 to 100. Find the probability that is perfect cube number.

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

PART – III (Marks - 50)

Note: Answer TEN questions. Question Number. 42 is compulsory. **10 x 5 = 50**

29. The function t which maps temperature in Celsius (C) into temperature in Fahrenheit (F) is defined by $t(C)=\frac{9}{5}C+32$. Find

    (i) $t(28)$

    (ii) $t(-10)$

    (iii) The value of C, when $t(C)=212$

    (iv) The temperature when the Celsius value is equal to the Fahrenheit value.

30. Find the sum to n terms of the series $5+55+555+....$

31. Rekha has 12 square colour papers of sizes 12 cm, 13 cm, 14 cm,...., 23 cm. How much area can be decorated with these colour papers?

32. If $A=\frac{2x+1}{2x-1}$ and $B=\frac{2x-1}{2x+1}$ then, find $\frac{1}{A-B}-\frac{2B}{A^2-B^2}$

33. If α and β are the roots pf the equation $3x^2+7x-2=0$, find the values of

    (i) $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}$ (ii) $\frac{\alpha^2}{\beta}+\frac{\beta^2}{\alpha}$

34. If $A=\begin{pmatrix}5 & 2 & 9\\ 1 & 2 & 8\end{pmatrix}$ and $B=\begin{pmatrix}1 & 7\\ 1 & 2\\ 5 & -1\end{pmatrix}$ then, verify that $(AB)^T=B^TA^T$

35. State Ceva's theorem. And using this theorem show that in a triangle, the medians are concurrent.

36. 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 $x-8y+9=0$.

37. From a window (h meters high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are θ_1 and θ_2 respectively. Show that the height of the opposite house is $h\left(1+\frac{\cot\theta_2}{\cot\theta_1}\right)$.

38. A right circular cylindrical container of base radius 6 cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 9 cm and base radius 3 cm, having a hemispherical cap. Find the number of cones needed to empty the container.

39. A solid iron cylinder has total surface area of 1848 sq. m. Its curved surface area is five-sixth of its total surface area. Find the radius and height of the iron cylinder.

40. Find the variance and standard deviation of the wages of 9 workers given below:

₹ 310, ₹ 290, ₹ 320, ₹ 280, ₹ 300, ₹ 290, ₹ 320, ₹ 310, ₹ 280

41. In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at random. Find the probability that
    (i). The student opted for NCC but not NSS
    (ii). The students opted for NSS but not NCC
    (iii). The students opted for exactly one of them.

42. $A=\{x\in \mathbb{N} \ / \ 1<x<4\}$, $B=\{x\in W \ / \ 0\le x<2\}$ and $C=\{x\in \mathbb{N} \ / \ x<3\}$ then, Verify that $A\times(B\cup C)=(A\times B)\cup(A\times C)$

PART - IV (Marks- 16)

Note: Answer both questions. **2 x 8 = 16**

43. (a). Draw a triangle ABC of base $BC=5.6$ cm, $\angle A=40^0$ and the bisector of $\angle A$ meets BC at D such that $CD=4$ cm.

OR

(b). Draw a circle of radius 4.5 cm. Take a point on the circle. Draw the tangent at that point using the alternate segment theorem.

44. (a). Draw the graph of $y=x^2-5x-6$ and hence solve $x^2-5x-14=0$

OR

(b). Graph the quadratic equations and state their nature of solutions $y=x^2-16$