



14) Convert  $\frac{\pi}{5}$  radian to degrees.

15) Find the number of subsets of A if  $A = \{x : x = 4n+1, 2 \leq n \leq 5, n \in \mathbb{N}\}$ .

**Part - C**

III. Answer three questions. Qn.No. 20 is compulsory:

**3×3=9**

16) Find the range of the function  $f(x) = \frac{1}{1-3\cos x}$

17) Solve the equation  $\sqrt{6-4x-x^2} = x+4$ .

18) Resolve into partial fractions:  $\frac{x}{(x+3)(x-4)}$

19) Find the length of an arc of a circle of radius 5 cm subtending a central angle measuring  $15^\circ$ .

20) Show that the relation  $xy = -2$  is a function for a suitable domain. Find the domain and the range of the function.

**Part - D**

IV. Answer all the questions:

**4×5=20**

21) In the set Z of integers, define mRn if m-n is divisible by 7. Prove that R is an equivalence relation. (OR)

If the arcs of same lengths in two circles subtend central angles  $30^\circ$  and  $80^\circ$ , find the ratio of their radii.

22) Let f, g:  $\mathbb{R} \rightarrow \mathbb{R}$  be defined as  $f(x) = 2x - |x|$  and  $g(x) = 2x + |x|$ . Find fog.

**(OR)**

Write the values of f at -4, 1, -2, 7, 0 if  $f(x) = \begin{cases} -x+4 & \text{if } -\infty < x \leq -3 \\ x+4 & \text{if } -3 < x < -2 \\ x^2-x & \text{if } -2 \leq x < 1 \\ x-x^2 & \text{if } 1 \leq x < 7 \\ 0 & \text{if otherwise} \end{cases}$

23) If  $a^2+b^2 = 7ab$ , show that  $\log \frac{a+b}{3} = \frac{1}{2}(\log a + \log b)$ .

**(OR)**

If the equations  $x^2-ax+b = 0$  and  $x^2-ex+f = 0$  have one root in common and if the second equation has equal roots, then prove that  $ae = 2(b+f)$ .

24) Find a quadratic polynomial f(x) such that  $f(0) = 1$ ,  $f(-2) = 0$  and  $f(1) = 0$ .

**(OR)**

If  $\cot\theta (1+\sin\theta) = 4m$  and  $\cot\theta (1-\sin\theta) = 4n$ , then prove that  $(m^2-n^2)^2 = mn$ .

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