Note:-
1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1. Select and write the correct answer. **(4)**

1. The range of the function $f(x) = \dfrac{x+2}{|x+2|}, x \neq -2$ is

    A) { -1, 1}   B) {-1, 0, 1}

    C) {1}   D) $(0, \infty)$

2. The domain of definition of $f(x) = \sqrt{4x - x^2}$ is

    A) $R - [0, 4]$ B) $R - (0, 4)$

    C) $(0, 4)$ D) $[0, 4]$

Q.2. Answer the following. **(3)**

1. If f(x) = 4[x] – 3, where [x] is greatest integer function of x, then find f(7.2)

2. If $f(x) = \begin{cases} 4x - 2 & x \leq -3 \\ 5 & -3 < x < 3 \\ x^2 & x \geq 3 \end{cases}$, then find f(1)

3. Express the following logarithmic equation in exponential form. $\log_{10} 0.001 = -3$

Section B
Attempt any Four

Q.3 f = {(ab, a + b) : a, b $\in$ Z}. Is f a function from Z to Z? Justify.   **(2)**

Q.4   Find fog and gof f(x) = 256x^4, g(x) = $\sqrt{x}$ **(2)**

Q.5   Find the domain of $f(x) = \log_{10}(x^2 - 5x + 6)$ **(2)**

Q.6   Find $(go) f(x)$ if $f(x) = \dfrac{x}{\sqrt{1 + x^2}}$ **(2)**

Q.7   Show that if f : A $\rightarrow$ B and g : B $\rightarrow$ C are onto, then gof is also onto.   **(2)**

Q.8   Find whether following function is one-one. f : R – {3} $\rightarrow$ R defined by $f(x) = \dfrac{5x + 7}{x - 3}$ for x $\in$ R – {3}   **(2)**

Section C
Attempt any Two

Q.9   If $\dfrac{\log_2 a}{4} = \dfrac{\log_2 b}{6} = \dfrac{\log_2 c}{3k}$ and a^{3}b^{2}c = 1. find the value of k.   **(3)**

Q.10 Let f: R $\rightarrow$ R is given by f(x) = x + 5 for all x $\in$ R. Draw its graph. **(3)**

Q.11 If f(x) = log(1 – x), $0 \le x \le 1$, show that $f\left(\dfrac{1}{1+x}\right) = f(1-x) - f(-x)$ **(3)**

Section D
Attempt any One

Q.12 If $\log\left(\dfrac{x+y}{3}\right) = \dfrac{1}{2}\log x + \dfrac{1}{2}\log y$, show that $\dfrac{x}{y} + \dfrac{y}{x} = 7$ **(4)**

Q.13 Find the domain and range of the following function. $f(x) = \sqrt{(x-2)(5-x)}$ **(4)**