a

$$n = \frac{V_a}{V_{sref}} 2^n$$

$$= \frac{4.17}{10} \times 2^3$$

$$= 3.336$$

Given,

$V_{sref} = 10V$

$V_a = 4.17V$

bit = 3

$R = 1K\Omega$

$C = 1\mu F$

So, count as a integer value = 3

So, binary output = 011

Ans:-

B

$T_{11} = 2^n \times$ counter period

$= 2^3 \times 1ms$

$= 8 ms$

$$V_{max} = \frac{V_a}{RC} \times T_1$$

$$= \frac{4.17}{1000 \times 10^{-6}} \times 8 \times 10^{-3}$$

$$= 33.36V$$

c maximum sampling rate is limited by the time required for worst case conversion:

$t_1 = t_2 = 8\ ms$

for worst case convertion duration =

$t_1 + t_2 = 16\ ms$

max sampling rate = $f_s = \frac{1}{T}$

$= \frac{1}{T_1 + T_2}$

$= \frac{1}{16 \times 10^{-3}}$

$62.5\ Hz$