GATE 2023 Instrumentation Engineering Question Paper (Memory-Based)

Question. What will be the next term 1, 3, 5, 7, 9, ___.

Answer. 11

Question. Evaluate x. sin(1/x) with lim x →0

Question. Consider the real valued function g(x) = (x − 2)² − 2x + 7 with (-∞, ∞) then find the minimum value of g(x)?

Answer. 2

Question. Function F(z) = 1/z is expanded up to ∞ power series around (z=2) would result in F(z) = ∑ak (z-2) to power k. Find the best suitable option.

Answer. $F(z) = \sum (-1)^n (z-2)^n / 2^{(n+1)}$

**Question. y(s)/x(s) = s − π/s + π and y(t) = sinπ t, then find x(t)=?**

Question. h(s) = δt + 0.5δ (t − 4) & x(t) = cos (7π/4t), Find the output.

Answer. output y(t) is equal to cos(7π/4t) for t ≠ 4, and 0 for t = 4.

Question. The no load steady state output voltage of a DC shunt generator is 200 V when it is driven in the clockwise direction at its rated speed, if the same machine is driven at the rated speed but in the opposite direction the steady state output voltage will be ____?

Answer. -200 V

Question. Given $i_s(t) = \pi\sin(3000t)$mA magnitude average current flowing through R is___?
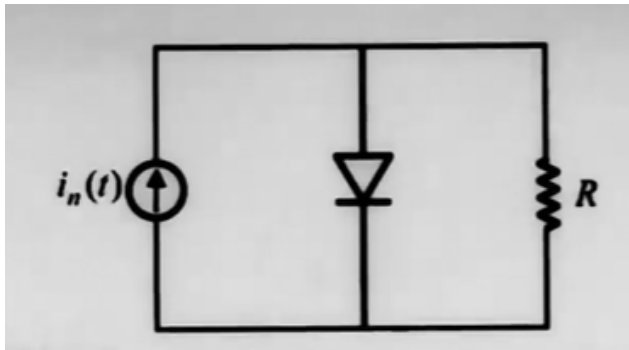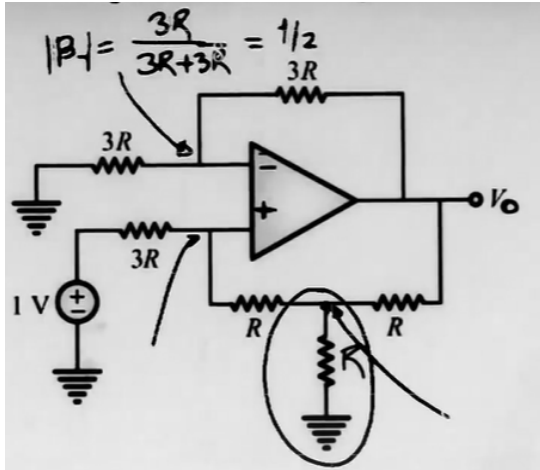

Answer. 1mA

Question.

The number of times the Nyquist plot of $G(S)H(s)$

$$\Rightarrow \frac{1}{2}\frac{(s-1)(s-2)}{(s+1)(s+2)}$$
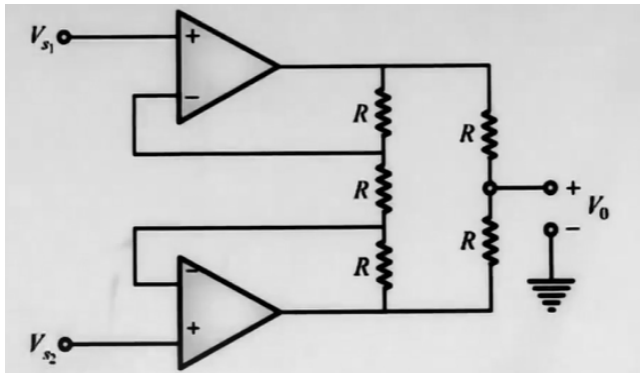
Encircles the origin is _____

Answer. 1

Question. In the circuit shown, assuming an ideal OP - Amp the value of output voltage
V_0 = ____

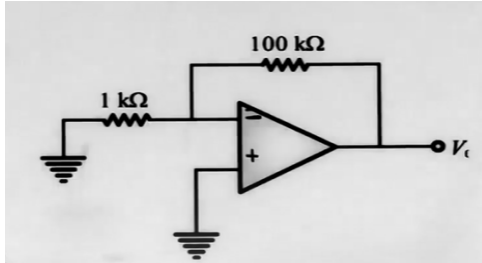**Answer. 2 V**

Question. The op amps in the circuit are ideal. The input signal are V_{s1}, =3x0.1 sin(300t)V and V_{s2} = -2 + 0.11 sin(300t)V . The average value of voltage V_0 is _____ V
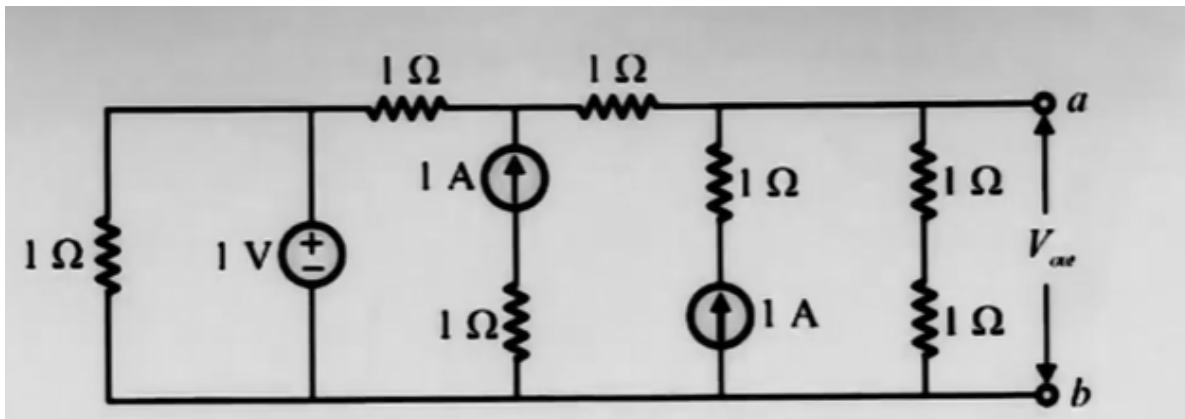

Answer. 0.5 V

Question. The opamp in the circuit shown is ideal, except that it has an input current of 1 nA and an input offset voltage of 10µV. The resulting worst — case output voltage will be ± _____ µV.

Answer. 1110

Question. In the circuit shown, the Thevenin equivalent resistance Rth across the terminal at b is

Answer. 1 Ohm

Question.

A short-circuit test is conducted on a single-phase transformer by shorting its secondary. The frequency of input voltage is 1 kHz. The corresponding are 8 W, 2 A & 6 V respectively. Assume that the no-load losses & the no-load currents are negligible, & the core has linear magnetic characteristics. Keeping the secondary shorted, the primary is connected to a 2 V (rms), 1 kHz sinusoidal source in series with ___. The primary current (rms) will be _____ A.

$$\frac{1}{2\pi\sqrt{5}} mF$$

Answer. 1 A