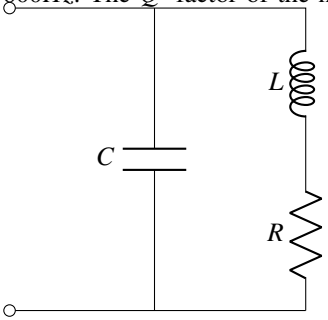
EE : Electrical Engineering

AI24BTECH11022 - Pabbuleti Venkata Charan Teja

27) An inductor having a $Q-$Factor of 60 is connected in series with a capacitor having a $Q-$factor of 240. The overall $Q-$factor of the circuit is _____ (round off to nearest integer) (2022)

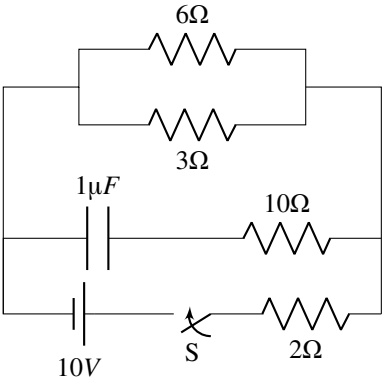
28) The network shown below has a resonant frequency of $150kHz$ and a bandwidth of $600Hz$. The $Q-$factor of the network is _____ (round off to nearest integer) (2022)



29) The maximum clock frequency in MHz of a 4−stage ripple counter, utilizing flip-flops, with each flip-flop having a propagation delay of $20ns$, is _____. (round off to one decimal place) (2022)

30) If only 5% of the supplied power to a cable reaches the output terminal, the power loss in the cable, in *decibels*, is _____. (round off to nearest integer) (2022)

31) In the circuit shown below, the switch S is closed at $t = 0$. The magnitude of the steady state voltage, in *volts*, across the 6Ω resistor is _____. (round off to two decimal places) (2022)



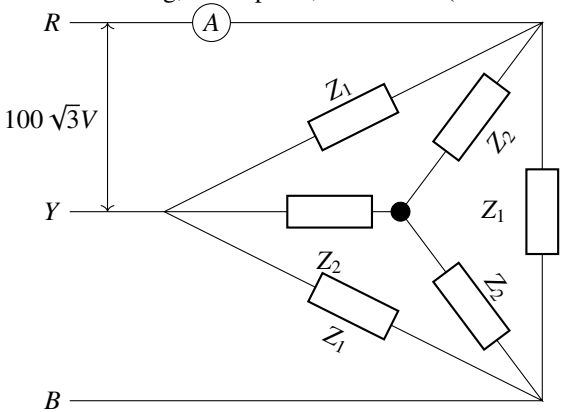
32) A single-phase full-bridge diode rectifier feeds a resistive load of 50Ω from a $200V$, $50Hz$ single phase AC supply. If the diodes are ideal, then the active power, in *watts*, drawn by the load is _____. (round off to nearest integer) (2022)

33) The voltage at the input of an AC-DC rectifier is given by $v(t) = 230\sqrt{2}sin\omega t$ where $\omega = 2\pi \times 50 rad/s$. The input current drawn by the rectifier is given by

$$i(t) = 10\sin\left(\omega t - \frac{\pi}{3}\right) + 4\sin\left(3\omega t - \frac{\pi}{6}\right) + 3\sin\left(5\omega t - \frac{\pi}{3}\right)$$

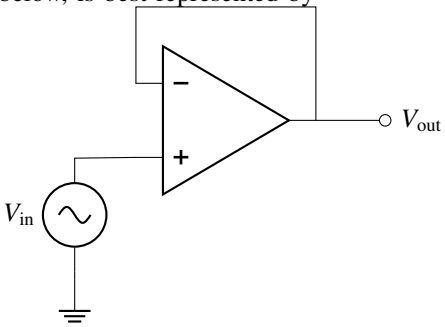
The input power factor, (rounded off to two decimal places), is, _____ lag. (2022)

34) Two balanced three-phase loads, as shown in the figure, are connected to a $100\sqrt{3}V$, three-phase, $50Hz$ main supply Given $Z_1 = (18 + j24)\Omega$ and $Z_2 = (6 + j8)\,\Omega$. The ammeter reading, in amperes, is _____. (round off to nearest integer) (2022)

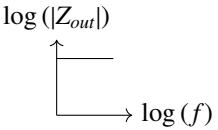


35) The frequencies of the stator and rotor currents flowing in a three-phase 8−pole induction motor are $40Hz$ and $1Hz$, respectively. The motor speed, in rpm, is _____. (round off to nearest integer) (2022)

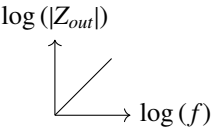
36) The output impedance of a non-ideal operational amplifier is denoted by Z_{out}. The variation in the magnitude of Z_{out} with increasing frequency, f, in the circuit shown below, is best represented by (2022)



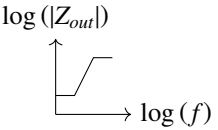
a)



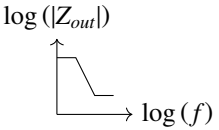
b)



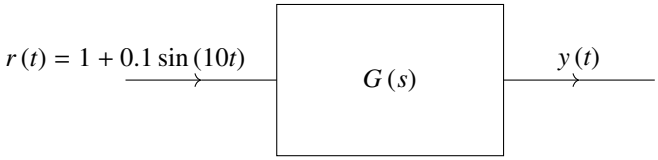
c)



d)

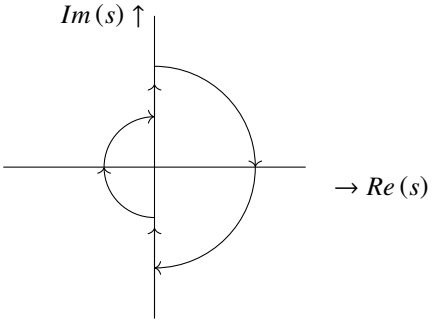


37) An LTI system is shown in the figure where $G(s) = \frac{100}{s^2+0.1s+10}$. The steady state output of the system, to the input $r(t)$, is given as $y(t) = a + b\sin(10t + \theta)$. The values of '$a$' and '$b$' will be (2022)



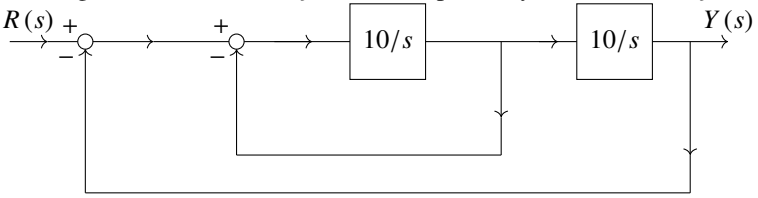
a) $a = 1,\ b = 10$
b) $a = 10,\ b = 1$
c) $a = 1,\ b = 100$
d) $a = 100,\ b = 1$

38) The open loop transfer function of a unity gain negative feedback system is given as $G(s) = \frac{1}{s(s+1)}$. The Nyquist contour in the $s-$plane encloses the entire right half plane and a small neighbourhood around the origin in the left half plane, as shown in the figure below. The number of encirclements of the point $(-1 + j0)$ by the Nyquist plot of $G(s)$, corresponding to the Nyquist contour, is denoted as N. Then N equals to (2022)



a) 0
b) 1
c) 2
d) 3

39) The damping ratio and undamped natural frequency of a closed loop system as shown in the figure, are denoted as ζ and w_n, respectively. The values of ζ and w_n are (2022)



a) $\zeta = 0.5$ and $w_n = 10 rad/s$
b) $\zeta = 0.1$ and $w_n = 10 rad/s$
c) $\zeta = 0.707$ and $w_n = 10 rad/s$
d) $\zeta = 0.707$ and $w_n = 100 rad/s$