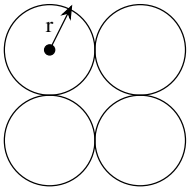
2021-MA- 14-26

AI24BTECH11018 - Sreya

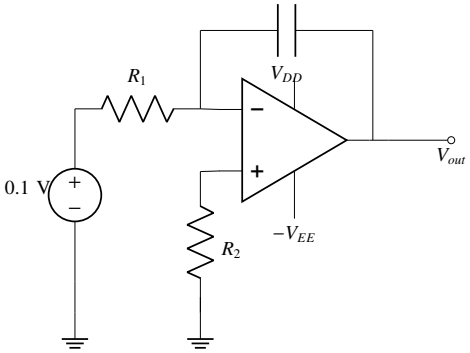
14) The geometric mean radius of a conductor having four equal strands with each strand r, as shown in the figure below, is



a) $4r$
b) $1.414r$
c) $2r$
d) $1.723r$

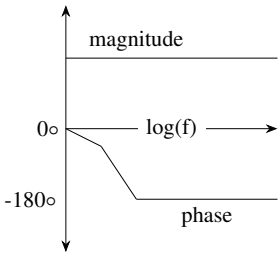
15) THe valid positive, negitive and zero sequence in $(inp \cdot u)$,respectively for a $220kV$ fully transposed three-phase transmission line, from the given choices are
a) $1.1, 0.15$ and 0.08
b) $0.15, 0.15$ and 0.35
c) $0.2, 0.2$ and 0.2
d) $0.1, 0.3$ and 0.1

16) The steady state output (V_out) of the circuit shown below, will



a) saturate to $+V_{DD}$
b) saturate to $-V_{EE}$
c) becomes equal to $0.1V$
d) becomes equal to $-0.1V$

17) The Body magnitude plot of a first order stable system is constant with frequency. The asymptotic value of high frequency phase,for the system is $-180\circ$. This system has



a) one LHP pole one RHP zero at the same frequency
b) one LHP pole one LHP zero at the same frequency
c) two LHP poles and one RHP zero.
d) two RHP poles and one LHP zero

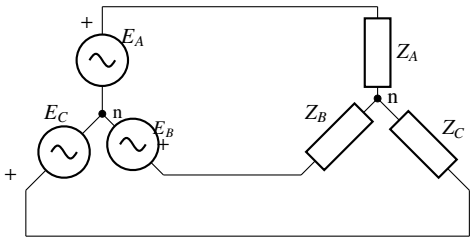
18) A balanced wheatstone bridge has the following arm resistance: $R_{AB} = 1K\Omega \pm 2.1$ percent; $R_{BC} = 100\Omega \pm 0.5$ percent; R_{CD} is a unknown resistance; $R_{DA} = 300\Omega \pm 0.4$ percent. The value of R_{CD} and its accuracy is
a) $30\Omega \pm 3\Omega$
b) $30\Omega \pm 0.9\Omega$
c) $3000\Omega \pm 90\Omega$
d) $3000\Omega \pm 3\Omega$

19) The open loop transfer function of a unity gain negive feedback system is given by $G(s) = \frac{k}{s^2+4s-5}$.The of K for which the system is stable, is
a) k>3
b) k<3
c) k>5
d) k<5

20) Consider a 3×3 matrix whose (i, j)-th element $a_{i,j} = (i - j)^2$.Then the matrix A will be
a) symmetric
b) skew-symmetric
c) unitary
d) null.

21) In the circuit shown below, a three phase star-connected unbalanced load is connected to a balanced three-phase supply of $100\sqrt{3}V$ with phase sequnce ABC. the star the voltage differnce across the nodes n and $n\prime$ is zero is

a) $20< -30\circ$



b) $20<30\circ$
c) $20<-60\circ$
d) $20<600\circ$

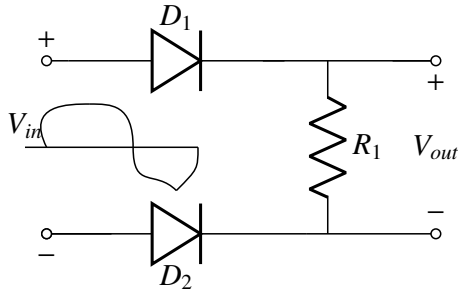
22) A charger supplies $100W$ at $20V$ for charging of battery of a laptop. The power devices, used in the converter inside the charger operate at a switching at a frequency of $200kHz$ which power devices is best suited for this purpose?
a) IGBT
b) Thyristor
c) MOSFET
d) BJT

23) A long conducting cylinder having a radius b is placed along Z axis. The current density is $J = J_a r^3 \hat{z}$ for the region $r<b$ where r is the distance in the radial direction. THe magnitude feild intensity (H) for the region inside of the conductor ($i.e for r<b$) is
a) $\frac{j_a}{4} r^4$
b) $\frac{j_a}{3} r^3$
c) $\frac{j_a}{5} r^5$
d) $j_a r^3$

24) The type of single phase induction motor, expected to have the maximum power factor during steady state running condition is
a) split phase ($resistance start$)
b) shaded pole
c) capacitor start
d) capacitor start, capacitor run.

25) For the circuit shown below with ideak diodes, the output will be

a) $Vout = V_{in}$ for $V_{in}>0$
b) $Vout = V_{in}$ for $V_{in}<0$
c) $Vout = -V_{in}$ for $V_{in}>0$



d) $Vout = -V_{in}$ for $V_{in}<0$

26) A MOD 2 and a MOD 5 up-counter when cascaded together results in a MOD counter