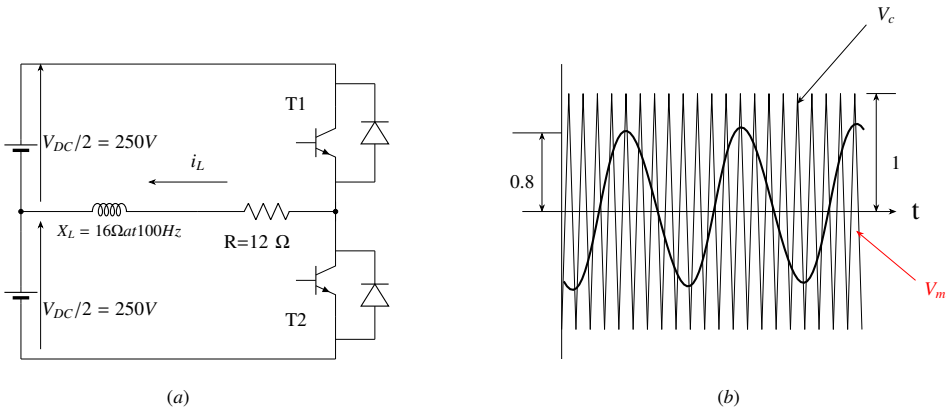
2016-EE-53-65

EE24BTECH11003 - Akshara Sarma Chennubhatla

53) A single-phase thyristor-bridge rectifier is fed from a $230V, 50$ Hz, single-phase AC mains. If it is delivering a constant DC current of 10 A, at firing angle of 30°, then value of the power factor at AC mains is (2016)

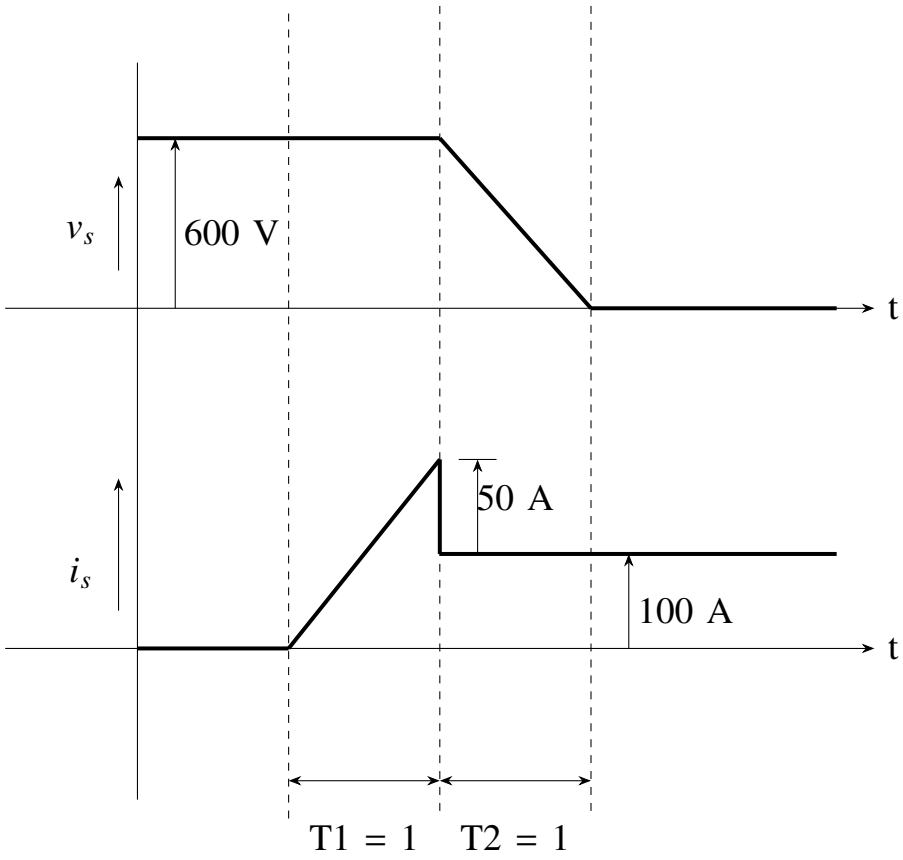
a) 0.87
b) 0.9
c) 0.78
d) 0.45

54) The switches $T1$ and $T2$ in Figure (a) are switched in a complementary fashion with sinusoidal pulse width modulation technique. The modulating voltage $v_m(t) = 0.8\sin(200\pi t)$ V and the triangular carrier voltage (v_c) are as shown in Figure (b). The carrier frequency is 5 kHz. The peak value of the 100 Hz component of the load current (i_L), in ampere, is _____. (2016)



(a) (b)

55) The voltage (v_s) across and the current (i_s) through a semiconductor switch during a turn-ON transition are shown in figure. The energy dissipated during the turn-ON transition, in mJ, is _____. (2016)



56) A single-phase 400 V, 50 Hz transformer has an iron loss of 5000 W at the rated condition. When operated at 200 V, 25 Hz, the iron loss is 2000 W. When operated at 416 V, 52 Hz, the value of the hysteresis loss divided by the eddy current loss is _____. (2016)

57) A DC shunt generator delivers 45 A at a terminal voltage of 220 V. The armature and the shunt field resistances are 0.01Ω and 44Ω respectively. The stray losses are 375 W. The percentage efficiency of the DC generator is _____. (2016)

58) A three-phase, 50 Hz salient-pole synchronous motor has a per-phase direct-axis reactance (X_d) of 0.8 pu and a per-phase quadrature-axis reactance $\left(X_q\right)$ of 0.6 pu. Resistance of the machine is negligible. It is drawing full-load current at 0.8 pf (leading). When the terminal voltage is 1 pu, per-phase induced voltage, in pu, is _____. (2016)

59) A single-phase, 22 kVA, 2200 V/ 220 V, 50 Hz, distribution transformer is to be connected as an auto-transformer to get an output voltage of 2420 V. Its maximum kVA rating as an auto-transformer is (2016)

a) 0.87
b) 0.9
c) 0.78
d) 0.45

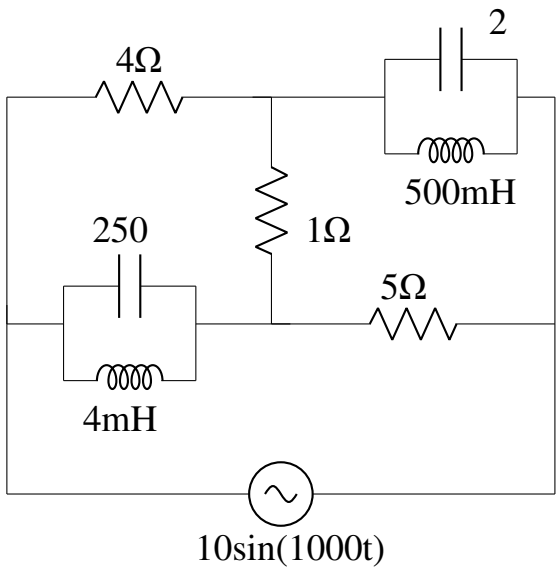
60) A single-phase full-bridge voltage source inverter (VSI) is fed from a 300 V battery. A pulse of 120° duration is used to trigger the appropriate devices in each half-cycle. The rms value of the fundamental component of the output voltage, in volts, is (2016)

a) 234
b) 245
c) 300
d) 331

61) A single-phase transmission line has two conductors each of 10 mm radius. These are fixed at a center-to-center distance of 1 m in a horizontal plane. This is now converted to a three-phase

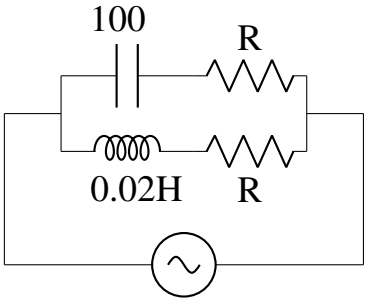
transmission line by introducing a third conductor of the same radius. This conductor is fixed at an equal distance D from the two single-phase conductors. The three-phase line is fully transposed. The positive sequence inductance per phase of the three-phase system is to be 5% more than that of the inductance per conductor of the single-phase system. The distance D, in meters, is _____. (2016)

62) In the circuit shown below, the supply voltage is $10\sin(1000t)$ volts. The peak value of the steady state current through the 1 Î© resistor, in amperes, is _____. (2016)



63) A dc voltage with ripple is given by $v(t) = [100 + 10\sin(\omega t) - 5\sin(3\omega t)]$ volts. Measurements of this voltage $v(t)$, made by moving-coil and moving-iron voltmeters, show readings of V_1 and V_2 respectively. The value of $V_2 \hat{a} V_1$, in volts, is _____. (2016)

64) The circuit below is excited by a sinusoidal source. The value of R, in Ω, for which the admittance of the circuit becomes a pure conductance at all frequencies is _____. (2016)



65) In the circuit shown below, the node voltage V_A is _____ V. (2016)