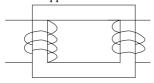
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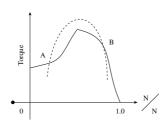
AI24BTECH11002 - K. Akshay Teja

- 1) The complete set of only those Logic Gates designated as Universal Gates is
 - a) NOT. OR and AND Gates

- c) NOR and NAND Gates
- b) XNOR, NOR and NAND Gates
- d) XOR, NOR and NAND Gates
- 2) The single phase, 50 Hz, iron core transformer in the circuit has both the vertical arms of cross sectional area 20 cm² and both the horizontal arms of cross sectional area 10 cm². If the two windings shown were wound instead on opposite horizontal arms, the mutual inductance will

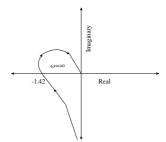


- a) double
- b) remain same
- c) be halved
- d) become one quarter
- 3) A 3-phase squirrel cage induction motor supplied from a balanced 3-phase source drives a mechanical load. The torque-speed characteristics of the motor (solid curve) and of the load (dotted curve) are shown. Of the two equilibrium points A and B, which of the following options correctly describes the stability of A and B?



- a) A is stable, B is unstable
- b) A is unstable. B is stable

- c) Both are stable
- d) Both are unstable
- 4) An SCR is considered to be a semi-controlled device because
 - a) it can be turned OFF but not ON with a gate pulse
 - b) it conducts only during one half-cycle of an alternating current wave
 - c) it can be turned ON but not OFF with a gate pulse
 - d) it can be turned ON only during one half-cycle of an alternating voltage wave
- 5) The polar plot of an open loop stable system is shown below. The closed loop system is

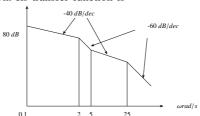


- a) always stable
- b) marginally stable

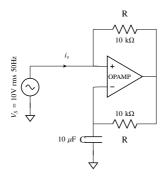
- c) unstable with one pole on the RH s-plane
- d) unstable with two poles on the RH s-plane
- 6) The first two rows of Routh's tabulation of a third order equation are as follows.

This means there are

- a) two roots at $s = \pm j$ and one root in right half s-plane
- b) two roots at $s = \pm i2$ and one root in left half s-plane
- c) two roots at $s = \pm i2$ and one root in right half s-plane
- d) two roots at $s = \pm j$ and one root in left half s-plane
- 7) The asymptotic approximation of the log-magnitude vs frequency plot of a system containing only real poles and zeros is shown. Its transfer function is

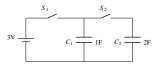


- 8) The trace and determinant of a 2×2 matrix are known to be -2 and -35 respectively. Its eigenvalues are
 - a) -30 and -5
- b) -37 and -1 c) -7 and 5
- d) 17.5 and -2
- 9) The following circuit has $R = 10k\Omega$, $C = 10\mu F$ The input voltage is a sinusoid at 50 Hz with an rms value of 10 V. Under ideal conditions, the current i_S from the source is



- a) $10\pi mA$ leading by 90°
- b) $20\pi mA$ leading by 90°

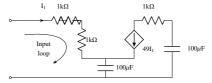
- c) 10mA leading by 90°
- d) $10\pi mA$ lagging by 90°
- 10) In the figure shown, all elements used are ideal. For time t < 0, S_1 remained closed and S_2 open. At t = 0, S_1 is opened and S_2 is closed. If the voltage V_{c2} across the capacitor C_2 at t = 0 is zero, the voltage across the capacitor combination at $t = 0^+$ will be



a) 1 V

b) 2 V

- c) 1.5 V
- d) 3 V
- 11) Transformer and emitter follower can both be used for impedance matching at the output of an audio amplifier. The basic relationship between the input power P_{in} and output power P_{out} in both cases is
 - a) $P_{in} = P_{out}$ for both transformer and emitter follower
 - b) $P_{in} > P_{out}$ for both transformer and emitter follower
 - c) $P_{in} < P_{out}$ for transformer and $P_{in} = P_{out}$ for emitter follower
 - d) $P_{in} = P_{out}$ for transformer and $P_{in} < P_{out}$ for emitter follower
- 12) The equivalent capacitance of the input loop of the circuit shown is



- a) $2 \mu F$
- b) 100 μF
- c) $200 \mu F$
- d) $4 \mu F$