

Which one of the following statements is NOT TRUE for a continuous time causal and stable LTI system?

- (A) All the poles of the system must lie on the left side of the  $j$  axis.
- (B) Zeros of the system can lie anywhere in the  $s$ -plane.
- (C) All the poles must lie within  $s = 1$ .
- (D) All the roots of the characteristic equation must be located on the left side of the  $j$  axis.

A single-phase transformer has no-load loss of 64 W, as obtained from an open-circuit test. When a short-circuit test is performed on it with 90% of the rated currents flowing in its both LV and HV windings, the measured loss is 81 W. The transformer has maximum efficiency when operated at

- (A) 50.0% of the rated current.
- (B) 64.0% of the rated current.
- (C) 80.0% of the rated current.
- (D) 88.8% of the rated current.

A bulb in a staircase has two switches, one switch being at the ground floor and the other one at the first floor. The bulb can be turned ON and also can be turned OFF by any one of the switches irrespective of the state of the other switch. The logic of switching of the bulb resembles

- (A) an AND gate (B) an OR gate (C) an XOR gate (D) a NAND gate

For a periodic signal  $v(t) = 30 \sin 100t + 10 \cos 300t + 6 \sin (500t + \pi / 4)$ , the fundamental frequency in rad/s is

- (A) 100 (B) 300 (C) 500 (D) 1500

A band-limited signal with a maximum frequency of 5 kHz is to be sampled. According to the sampling theorem, the sampling frequency in kHz which is not valid is

- (A) 5 (B) 12 (C) 15 (D) 20

Consider a delta connection of resistors and its equivalent star connection as shown below. If all elements of the delta connection are scaled by a factor  $k$ ,  $k > 0$ , the elements of the corresponding star equivalent will be scaled by a factor of



- (A)  $k^2$  (B)  $k$  (C)  $1/k$  (D) root  $k$

The angle  $\delta$  in the swing equation of a synchronous generator is the

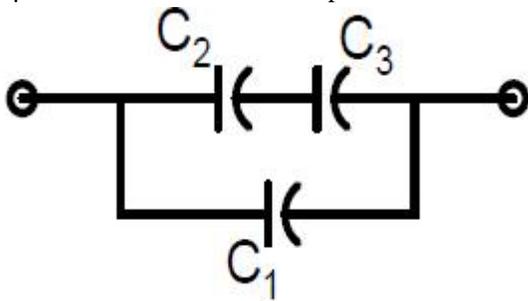
- (A) angle between stator voltage and current.
- (B) angular displacement of the rotor with respect to the stator.

- (C) angular displacement of the stator mmf with respect to a synchronously rotating axis.
- (D) angular displacement of an axis fixed to the rotor with respect to a synchronously rotating axis.

Leakage flux in an induction motor is

- (A) flux that leaks through the machine
- (B) flux that links both stator and rotor windings
- (C) flux that links none of the windings
- (D) flux that links the stator winding or the rotor winding but not both

Three capacitors  $C_1$ ,  $C_2$ , and  $C_3$ , whose values are  $10\mu\text{F}$ ,  $5\mu\text{F}$ , and  $2\mu\text{F}$  respectively, have breakdown voltages of 10V, 5V, and 2V respectively. For the interconnection shown, the maximum safe voltage in Volts that can be applied across the combination and the corresponding total charge in  $\mu\text{C}$  stored in the effective capacitance across the terminals are respectively



- (A) 2.8 and 36 (B) 7 and 119
- (C) 2.8 and 32 (D) 7 and 80

The slip of an induction motor normally does not depend on

- (A) rotor speed (B) synchronous speed
- (C) shaft torque (D) core-loss component

The bridge method commonly used for finding mutual inductance is

- (A) Heaviside Campbell bridge (B) Schering bridge
- (C) De Sauty bridge (D) Wien bridge

The output Y of a 2-bit comparator is logic 1 whenever the 2-bit input A is greater than the 2-bit input B. The number of combinations for which the output is logic 1, is

- (A) 4 (B) 6 (C) 8 (D) 10

The typical ratio of latching current to holding current in a 20 A thyristor is

- (A) 5.0
- (B) 2.0
- (C) 1.0

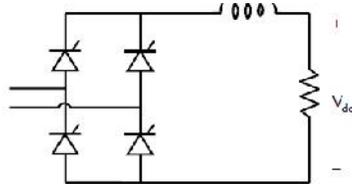
(D) 0.5

A three-phase, 33kV oil circuit breaker is rated 1200A, 2000MVA, 3s. The symmetrical breaking current is

- (A) 1200 A (B) 3600 A (C) 35 kA (D) 104.8 kA

The fully controlled thyristor converter in the figure is fed from a single-phase source. When the firing angle is  $0^\circ$ , the dc output voltage of the converter is 300 V. What will be the output voltage for a firing angle of  $60^\circ$ , assuming continuous conduction?

(A) 150V



(B) 210V

(C) 300V

(D)  $100\pi$  V