BARC Electronics and electrical Question papers

1. Differential amplifiers are used in
   a. instrumentation amplifiers
   b. voltage followers
   c. voltage regulators
   d. buffers

2. The output voltage Vo of the above circuit is

   ![Circuit Diagram]

   a. -6V
   b. -5V
   c. -1.2V
   d. -0.2V

3. The ideal OP-AMP has the following characteristics.
   a) \( R_i = \infty \), \( A = \infty \), \( R_0 = 0 \)
   b) \( R_i = 0 \), \( A = \infty \), \( R_0 = 0 \)
   c) \( R_i = \infty \), \( A = \infty \), \( R_0 = \infty \)
   d) \( R_i = 0 \), \( A = \infty \), \( R_0 = \infty \)

4. How many op-amps are required to implement this equation

   \[ V_o = -\left( \frac{R_f}{R_1} V_1 + \frac{R_f}{R_2} V_2 + \frac{R_f}{R_3} V_3 \right) \]
A very brief, high voltage spike on an ac power line is called as
A. A bleeder
B. An arc
C. A transient
D. An avalanche
E. A clipped peak

You can find the zener diode in
A. The mixer in a superheterodyne receiver
B. The PLL in a circuit for detecting FM
C. The product detector in a receiver for SSB
D. The voltage regulator in a power supply
E. The AF oscillator in an AFSK transmitter

A network function can be completely specified by:
(A) Real parts of zeros
(B) Poles and zeros
(C) Real parts of poles
(D) Poles, zeros and a scale factor

A unit impulse voltage is applied to one port network having two linear components. If the current through the network is 0 for t<0 and decays exponentially for t>0 then the network consists of
(A) R and L in series
(B) R and L in parallel
(C) R and C in parallel
(D) R and C in series

The Q-factor of a parallel resonance circuit consisting of an inductance of value 1mH, capacitance of value 10^-5 F and a resistance of 100 ohms is
(A) 1
(B) 10
(C) n 20
(D) 100

In a travelling electromagnetic wave, E and H vector fields are
(A) perpendicular in space.
(B) parallel in space.
(C) E is in the direction of wave travel.
(D) H is in the direction of wave travel.

The lower cut-off frequency of a rectangular wave guide with inside dimensions (3 x 4.5 cm) operating at 10 GHz is
(A) 10 GHz.
(B) 9 GHz.
(C) 10/9GHz.
(D) 10/3GHz

The intrinsic impedance of free space is
(A) 75 ohm.