

- The unit of magnetic flux density is

- gauss
- tesla
- bohr
- weber per sec

Answer – tesla

- Match List-I with List-II and select the correct answer using the code given below the Lists :

- | | |
|-----------------------|--|
| A. Antiferro-magnetic | 1. Permanent magnetic dipoles |
| B. Ferri-magnetism | 2. Dipoles interact or line up in parallel |
| C. Dia-magnetic | 3. Neighbouring magnetic moments are aligned anti parallel with equal magnitudes |
| D. Ferro-magnetic | 4. Neighbouring magnetic moments are aligned anti parallel with unequal magnitudes |

- a4b3c1d2
- a2b3c1d4
- a4b1c3d2
- a2b1c3d4

Answer – a4b1c3d2

- Skin depth is the distance from the conductor surface where the field strength has fallen to π of its strength at the surface

- e of its strength at the surface
- $(1/e)$ of its strength at the surface
- $(1/\pi \cdot e)$ of its strength at the surface

Answer -- $(1/e)$ of its strength at the surface

- The electric field in the vicinity of two oppositely charged parallel conductors is radial uniformly in parallel lines between the two imaginary parallel planes passing through the centers of the two conductors

- not uniform and its direction changes from point to point
- in parallel circular paths between the two conductors, with the center of the circles located at the mid-point of a line joining the two centers of the two conductors

Answer -- not uniform and its direction changes from point to point

- Two charges are placed at a distance apart. Now, if a glass slab is inserted between them, then the force between the charges will

- reduce to zero
- increase
- decrease
- not change

Answer – decrease

- The presence of one of the following materials, in iron or steel for use as a magnetic material, tends to reduce the hysteresis loss

- Carbon
- Sulphur
- Phosphorus

- Silicon

Answer – Silicon

- The angle between two adjacent asymptotes in a root locus diagram is
 - $\pi/n+m$
 - $2\pi/n+m$
 - $\pi/n-m$
 - $2\pi/n-m$

Answer – $2\pi/n-m$

- The equation of continuity defines the relation between
 - electric field and magnetic field
 - electric field and charge density
 - flux density and charge density
 - current density and charge density

Answer -- current density and charge density

- The maximum power will be transferred from a voltage source to a load when
 - the source impedance is half that of the load impedance
 - the source impedance is equal to that of the load impedance
 - the source impedance is twice that of the load impedance
 - both source and load impedance must be zero

Answer -- the source impedance is equal to that of the load impedance

- For a series and a parallel circuit, the equivalent total value of certain parameter X is given by $X_e = X_1 + X_2 + X_3 + X_4 + \dots + X_n$ where X_i is the i th value of the parameter and X_e is the equivalent value, and n is the number of elements. The parameter X can be
 - resistance
 - current
 - voltage
 - power

Answer – voltage

- A coil having 250 turns is connected to a 50 V DC source. If the coil resistance is 10Ω , the m.m.f. (magneto-motive force) developed in AT would be
 - 500
 - 1250
 - 2500
 - 500

Answer – 1250

- A single-phase energy meter having meter constant of 200 rev/kWh is operating on 230 V, 50 Hz supply with a load of 10 A, and at unity power factor for three hours continuously. The number of revolutions shown by the meter during this period is
 - 13800
 - 1380
 - 276

• 138

Answer – 1380

- In a linear network, a 1.0 resistor consumes a power of 4 W when voltage source of 4 V is applied to the entire circuit, and 16 W when the voltage source is replaced by an 8 V source. The power consumed by the 192 resistor when 12 V is applied will be

- 20
- 36
- 144
- 38

Answer – 36

- Consider the following statements Any element connected in
 1. series with a voltage source is redundant
 2. parallel with a voltage source is redundant
 3. series with a current source is redundant
 4. parallel with a current source is redundant

- 1,3
- 2,3
- 3,4
- 1,2

Answer – 2,3

- The lowest and the highest critical frequencies of R-C driving-point impedance are respectively
 - a zero and a pole
 - a pole and a pole
 - a zero and a zero
 - a pole and a zero

Answer -- a pole and a zero

- The following is not essential for the working of an indicating instrument
 - Deflecting torque
 - Breaking torque
 - Damping torque
 - Controlling torque

Answer -- Breaking torque

- Systematic error of an instrument for measurement can be minimized by
 - selecting a proper measuring device for the particular application
 - calibrating the measuring device against a standard device
 - applying correction factors for change of ambient conditions
 - carrying out all of it above

Answer -- carrying out all of it above

- A linear displacement digital transducer uses
 - BCD code
 - Gray code
 - hexadecimal code

- binary code

Answer -- Gray code

- An electronic voltmeter gives more accurate readings in high-resistance circuits as compared to a non-electronic voltmeter because of its
 - low meter resistance
 - high $k\Omega/V$ rating
 - high $V/k\Omega$ rating
 - high resolution

Answer -- high $k\Omega/V$ rating

- By mistake, an ammeter is used as a voltmeter. In all probabilities, it will
 - give much higher reading
 - give extremely low reading
 - indicate no reading at all
 - get damaged

Answer -- get damaged

- The meter constant of a single-phase energy meter is 500 rev/kWh. It is found that with a load of 5 kW, it makes 40 revolutions in 50 sec. The percentage error is
 - 5.25%
 - 10.5%
 - 15.25%
 - 20%

Answer --20%

- A shunt resistance of 25Ω is required for extending the range of an ammeter from 100
 - 25
 - 50
 - 100
 - 1000

Answer --100

- Modern electronic multimeter measure resistance by
 - taking advantage of an electronic bridge compensator for nulling
 - forcing a constant current and measuring the voltage across unknown resistance
 - using a bridge circuit
 - applying a constant voltage across the unknown resistance and measuring the current through it

Answer -- forcing a constant current and measuring the voltage across unknown resistance

- Guard circuits are used in insulation resistance measurements to
 - increase the range of resistance values measured
 - reduce the effect of leakage current on measurement
 - protect against external electric fields
 - protect against external magnetic fields

Answer -- reduce the effect of leakage current on measurement

- The preferred methods of measuring low resistance and the resistance of cable insulation are respectively
 - V/I method and loss-of-charge method
 - Kelvin's double bridge and Megger test
 - Wheatstone bridge and Kelvin's double bridge
 - potentiometer method and Wheatstone bridge
 Answer -- Kelvin's double bridge and Megger test
- The phase-lead compensation is used to
 - increase rise time and decrease overshoot
 - decrease both rise time and overshoot
 - increase both rise time and overshoot
 - decrease rise time and increase overshoot
 Answer -- decrease rise time and increase overshoot
- The open-loop transfer function of the feedback control system is given by $G(s)=k/(s+1)(s+2)(s+3)$. The breakaway point in its root locus will be
 - between -2 and -3
 - between -1 and -2
 - between 0 and -1
 - beyond -3
 Answer -- between -1 and -2
- Given a badly under damped control system, the type of cascade compensator to be used to improve its damping is
 - phase-lead
 - phase-lag
 - phase-lag-lead
 - notch filter
 Answer – phase-lead
- The compensator $G_c(s)=5(1+.3s)/1+.1s$ would provide a maximum phase shift of
 - 20 degree
 - 30 degree
 - 45 degree
 - 60 degree
 Answer -- 30 degree

Directions :

Each of the following ten (10) items consists of two statements, one labelled as Statement (I) and the other as Statement (II). You are to examine these two statements carefully and select the answers to these items using the code given below :

Code :

- (a) Both Statement(I) and Statement(II) are individually true and Statement(II) is the correct explanation of Statement (I)
- (b) Both Statement(I) and Statement(II) are individually true but Statement (II) is not the correct explanation of Statement (I)
- (c) Statement(I) is true but Statement (II) is false

(d) Statement (I) is false but Statement (II) is true

- Statement (I):
Polarization is due to the application of an electric field to dielectric materials.
Statement (II):
When the dipoles are created, the dielectric is said to be polarized or in a state of polarization.
a
b
c
d
Answer – a
- Statement (I):
Alnico magnet alloys have the highest energy per unit of cost or volume of any permanent magnetic material commercially available.
Statement (II):
They are very hard and brittle, therefore they cannot be machined and have to be cast and finished by grinding.
a
b
c
d
Answer – d
- Statement (I):
The network function $N(s)$ is denoted with scale factor multiplied with the ratio of zero factors with pole factors.
Statement (II):
When there are n zeros and m poles, then the poles at infinity are of multiplicity or degree of $(n-m)$. Similarly when $n < m$, then the zeros at infinity are of multiplicity or degree of $(m-n)$.
a
b
c
d
Answer – a
- Statement (I):
Under steady-state conditions, a pure inductance acts as a short circuit for direct current.
Statement (II):
The potential drop across an inductance is proportional to the rate of change of current.
a
b
c
d
Answer – a

- Statement (I):
Vibration galvanometer is widely used as detector in bridge measurements.
Statement (II):
Since the damping is very small, the deflection of the moving system is very much greater in neighborhood of resonance than at any other frequency.
a
b
c
d
Answer – a
- Statement (I):
The measurement of voltage magnitude by a cathode-ray oscilloscope is very fast as compared to other methods of measurement.
Statement (II):
Cathode-ray beam travels at the speed of light.
a
b
c
d
Answer – b
- Statement (I):
An electronic voltmeter measures the voltage across a high-value resistor more accurately as compared with an ordinary multimeter.
Statement (II) :
The input impedance of the electronic voltmeter is many orders of magnitude higher than that of an ordinary multimeter.
a
b
c
d
Answer – a
- Statement (I) :
A hot-wire instrument gives the r.m.s. value of the current measured.
Statement (II) :
The heat generated is dependent on the average value of the current.
a
b
c
d
Answer – c

- Statement (I) :
The rotor of a servomotor is built with resistance so that its X/R ratio becomes small.
Statement (II) :
The servomotor has good accelerating characteristics.

a
b
c
d

Answer – c

- Statement (I) :
Control system components for aviation systems are designed for 400 Hz.
Statement (II) :
The weight of the components reduces when designed for higher frequencies.

a
b
c
d

Answer -- b

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