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Volume-1

Network Theory

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UNIT-I

NETWORK THEORY

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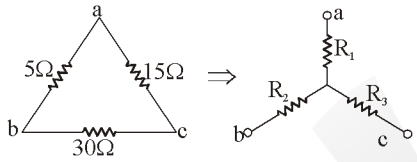
BASICS OF CIRCUIT AND CIRCUIT LAW

CHAPTER 1

OBJECTIVE QUESTIONS

1. A delta connected network with its Y-equivalent is shown in figure. The resistances R_1, R_2 and R_3 (in ohms) are respectively



(a) 1.5, 3 and 9 (b) 3, 9 and 1.5

(c) 9, 3 and 1.5 (d) 3, 1.5 and 9

2. A network contains linear resistors and ideal voltage sources. If values of all the resistors are doubled then the voltage across each resistor is

(a) Halved (b) Doubled

(c) Increased by four times (d) Not changed

3. A 3 H inductor has 2000 turns. How many turns must be added to increase the inductance to 5H?

(a) 1000 turns (b) 2500 turns

(c) 2582 turns (d) 582 turns

4. An electric circuit with 10 branches and 7 nodes will have

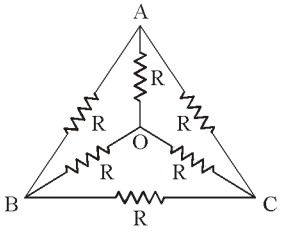
(a) 3 loop equations (b) 4 loop equations

(c) 7 loop equations (d) 10 loop equations

5. The response of network is $i(t) = Kt\, e^{-\alpha t}$ for $t \geq 0$ where α is real positive. The value of 't' at which the i(t) will become maximum, is

(a) α (b) 2α (c) $\frac{1}{\alpha}$ (d) α^2

6. The effective resistance between the terminals A and B in the circuit shown in the figure is



(a) R (b) R–1 (c) $\frac{R}{2}$ (d) $\frac{6}{11}R$

7. If the length of a wire of resistance R is uniformly stretched to n times its original value, its new resistance is

(a) nR (b) $\frac{R}{n}$ (c) n^2R (d) $\frac{R}{n^2}$

8. Two wires A and B of the same material and length L and 2L have radius r and 2r respectively. The ratio of their specific resistance will be

(a) 1 : 1 (b) 2 : 1 (c) 1 : 4 (d) 1 : 8

9. Two incandescent light bulbs of 40 W and 60 W rating are connected in series across the mains. Then

(a) The bulbs together consume 100 W

(b) The bulbs together consume 50 W

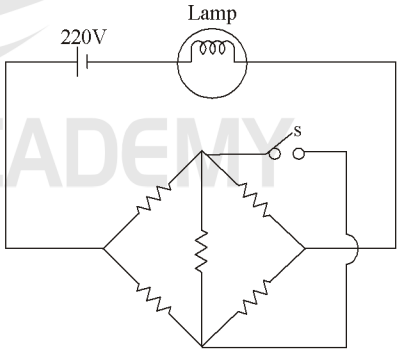
(c) The 60 W bulb glows brighter

(d) The 40 W bulb glows brighter

10. Twelve 1 Ω resistances are used as edges to form a cube. The resistance between the two diagonally opposite corners of the cube is

(a) $\frac{5}{6}\Omega$ (b) 1 Ω (c) $\frac{6}{5}\Omega$ (d) $\frac{3}{2}\Omega$

11. All resistance in the given circuit are at R Ω each. The switch is initially open. What happens to the lamp's intensity when the switch is closed?



(a) Increases (b) Decreases

(c) Remains the same (d) Depends on the value of R

12. If each branch of a delta circuit has impedance $\sqrt{3}$ Z, then each branch of equivalent star circuit has impedance would be

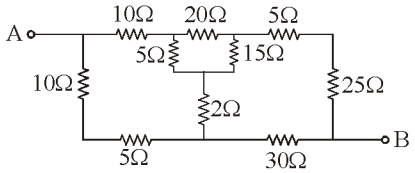
(a) $\frac{Z}{\sqrt{3}}$ (b) Z (c) $2\sqrt{3}$ Z (d) $\frac{Z}{3}$

76. It is known that two 2Ω, 2W resistors are connected in parallel. Find the combined resistance and wattage rating.

(a) 2Ω, 4W (b) 1Ω, 4W (c) 1Ω, 2W (d) 2Ω, 2W

[UPPCL JE - 2014]

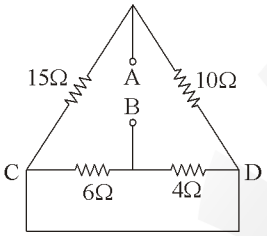
77. Consider the following circuit and determine the equivalent resistance between A and B.



(a) 15.76 Ω (b) 1.63 Ω (c) 23.52 Ω (d) 2.04 Ω

[UPPCL JE - 2014]

78. In the following circuit, determine the equivalent resistance between points A and B.



(a) 8.4 Ω (b) 4 Ω (c) 2.5 Ω (d) 6.8 Ω

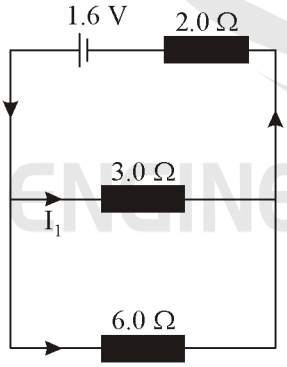
[UPPCL JE - 2014]

79. If 10 lamps are connected in series across a power supply, then determine the voltage of the supply when it is given that the voltage across each lamp is 6.0 V.

(a) 60 V (b) 20 V (c) 35 V (d) 42 V

[UPPCL JE - 2014]

80. Consider the following given circuit and find the value of total current drawn from the cell and the potential difference across the 3Ω resistor respectively.



(a) 0.4 A, 0.8 V (b) 0.85 A, 0.6 V

(c) 0.56 A, 0.8 V (d) 0.9 A, 0.8 V

[UPPCL JE - 2014]

81. Current in a circuit is measured using a simple slide wire. What will be the voltage drop per unit length. If the standard cell is of emf 2.38 V balanced at length of 35 cm.

(a) 0.68 V/cm (b) 0.068 V/cm

(c) 68 V/cm (d) 6.8 V/cm

[UPPCL JE - 2014]

82. The element which is capable of delivering energy by its own is known as :

(a) Non-linear element (b) Unilateral element

(c) Active element (d) Passive element

[NMRC JE - 2017]

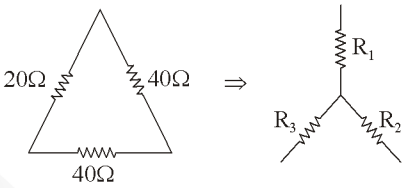
83. _____ remains same in all parts of a series circuit.

(a) Current (b) Resistance

(c) Voltage (d) Power

[NMRC - JE-2017]

84. Convert the Delta network into equivalent Star network:



(a) $R_1 = 8\Omega, R_2 = 8\Omega, R_3 = 8\Omega$

(b) $R_1 = 8\Omega, R_2 = 16\Omega, R_3 = 16\Omega$

(c) $R_1 = 8\Omega, R_2 = 8\Omega, R_3 = 16\Omega$

(d) $R_1 = 8\Omega, R_2 = 16\Omega, R_3 = 8\Omega$

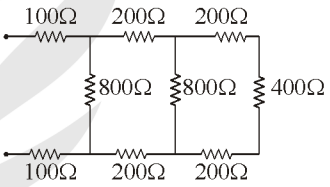
[NMRC JE - 2017]

85. Unit of reactive power is:

(a) Watt (b) Kilo Watt

(c) VAR (d) Volt Ampere

86. The equivalent resistance of the given circuit is:



(a) 200 Ω (b) 400 Ω (c) 600 Ω (d) 1600 Ω

87. With the increase in the cross sectional area of the conductor, the value of resistance:

(a) Increase (b) Remain same

(c) Decrease (d) None of these

88. To neglect a current source, the terminal across the sources are:

(a) Open-circuited

(b) Short-circuited

(c) Replaced by some resistance

(d) Replaced by capacitance

89. An electric current is the

(a) Random movement of electrons in a conductor

(b) Movement of free electrons predominately in one direction

(c) Pressure difference between two poles

(d) The power that causes drift of electrons

129. The circuit whose properties are same in either direction is known as

(a) Unilateral circuit (b) Bilateral circuit

(c) Irreversible circuit (d) Reversible circuit

[DSSSB JE - 2015]

130. The number of independent equations to solve a network is equal to

(a) The number of chords

(b) The number of branches

(c) Sum of the number of branches and chords

(d) Sum of number of branches, chords and nodes

[DSSSB JE - 2015]

131. Siemens is a unit for measuring

(a) Resistance (b) Flux density

(c) Conductance (d) Electric field

[TNPSC AE - 2018]

132. "The mass of an ion liberated at an electrode is directly proportional to the quantity of electricity".

The above statement is associated with

(a) Newton's law

(b) Faraday's law of electromagnetics

(c) Faraday's law of electrolysis

(d) Gauss's law

[TNPSC AE - 2018]

133. What is the equivalent resistance of one limb A when delta connection is transformed into star?

(a) $R_1 R_3 / R_1 + R_2 + R_3$ (b) $R_2 R_3 / R_1 - R_2 + R_3$

(c) $R_1 R_2 R_3 / R_1 + R_2 + R_3$ (d) $R_1 + R_2 + R_3$

[Jammu & Kashmir JE - 2016]

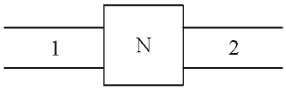
134. A linear circuit contains ideal resistors and ideal voltage source. If values of all the resistors are halved then voltage across each resistor becomes.

(a) Halved (b) Doubled

(c) Remained unchanged (d) Decreased by 4 times

[UPRVUNL JE - 2016]

135. In two-port network N has the transmission parameter $\begin{bmatrix} A & B \\ C & D \end{bmatrix}$. The open circuit input impedance of the network at port-1 will be–



(a) AD/BC (b) D/C (c) AB/DC (d) A/C

[Coal India ltd. - 2017]

136. For a two port network to be reciprocal :

(a) $Z_{11} = Z_{22}$ (b) $Y_{12} = Y_{21}$

(c) $H_{21} = H_{22}$ (d) $AD - BC = 0$

[Jammu & Kashmir JE - 2016]

137. Select the correct statement from the following

(a) An electrical network and electrical circuit are same

(b) An electrical network has no relation to electrical circuit

(c) An electrical circuit should have at least one closed loop

(d) An electrical circuit need not have any closed loop

[UPRVUNAL - 2014]

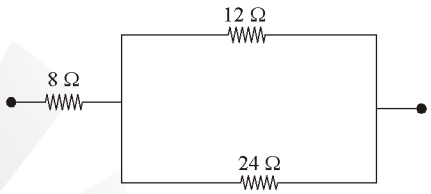
138. The laws used in tie set and cut set of a network are –

(a) Ohms law (b) Kirchhoff's laws

(c) Biot Savart's law (d) Lorentz's law

[UPRVUNALAE - 2014]

139. The equivalent resistance of a series parallel circuit shown in the figure is :



(a) 8 ohms (b) 10 ohms (c) 12 ohms (d) 16 ohms

[ESIC JE - 2016]

140. A star circuit has Each branch resistance of R/2. The equivalent delta each branch resistance will be :

(a) R/6 (b) 3 R/2 (c) 2 R (d) 4 R

[ESIC JE - 2016]

141. An electric circuit with 10 branches and 7 nodes will have :

(a) 4 loop equation (b) 7 loop equation

(c) 10 loop equations (d) 5 loop equations

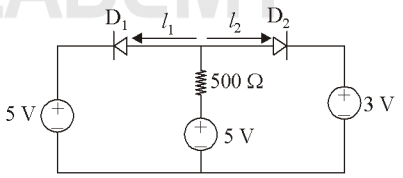
[FCI - 2015]

142. In terms of ABCD parameters, a two port network is symmetrical if and only if

(a) A = B (b) B = C (c) C = D (d) D = A

[Uttrakhand AE - 2013]

143. In the circuit shown below, D_1 and D_2 are ideal diodes. The current I_1 and I_2 are :



(a) Zero, 4 mA (b) 4 mA, Zero

(c) Zero, 8 mA (d) 8 mA, Zero

[UPRVUNLAE - 2016]

144. Network which contain one or more than one source of emf is known as

(a) Active Network (b) Passive Network

(c) Electric network (d) None of these

[BSNL TTA - 2016]

190. What is the equivalent resistance of a network having 5 resistors of each 10 ohm connected in parallel ?

(a) 10 Ω (b) 50 Ω (c) 500 Ω (d) 2 Ω

[Jammu & kashmir JE - 2016]

191. Three resistors of 20 Ω, 100 Ω and 5 Ω are connected in parallel, what is the effective resistance ?

(a) 7.5 Ω (b) 2.85 Ω (c) 35 Ω (d) 3.84 Ω

[UPRVUNL JE - 2016]

192. A lamp rated at 60V, 40 W is to be connected across 230V. What is the value of resistance to be connected in series with lamp ?

(a) 100 Ω (b) 255 Ω (c) 90 Ω (d) 345 Ω

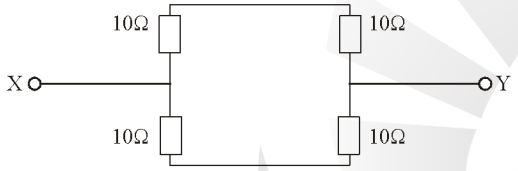
[UPRVUNL JE - 2016]

193. If the length of a wire having uniform resistance r is stretched in m times with volume remaining same. What will be new resistance value ?

(a) R/m (b) Rm^2 (c) mR (d) R/m^2

[UPRVUNL JE - 2016]

194. Find out resistance between X and Y in following :



(a) 5 Ω (b) 20 Ω (c) 10 Ω (d) 40 Ω

[UPRVUNL JE - 2016]

195. Whenever current is supplied by a source its terminal voltage :

(a) Increases (b) Decreases

(c) Remains constant (d) None of the above

[UP Jal Nigam AE - 2016]

196. The current rating of a 5 kΩ, 1/2 W resistor is :

(a) 1 A (b) 0.1 (c) 0.001 (d) 0.01

[MPPKVVCL - 2017]

197. A 1 ϕ 220 V, 1000 W resistive electric heater is connected to a 110 V-DC source. What is the power absorbed by the heater from the 110 V source ?

(a) 500 W (b) 110 W (c) 250 W (d) 750 W

[MPPKVVCL - 2017]

198. A conductors provides a path for flow of current in circuit due to which properties

(a) Conductance (b) reluctance

(c) resistance (d) inductance

[ESIC JE - 2016, JUVNL JE - 2017]

199. A filament lamp of 40 W, 110 V is connected in series with resistance R. If the supply voltage is 230 V, then the value of resistance R should be :

(a) 330 ohm (b) 340 ohm (c) 130 ohm (d) 240 ohm

[KVS JE - 2016]

200. The temperature coefficient of resistance of a material is given as :

(a) $\frac{R_1 - R_0}{R_0(t_2 - t_1)}$ (b) $\frac{R_0 - R_1}{R_1(t_1 - t_2)}$

(c) $\frac{R_t}{R_0(t_2 - t_1)}$ (d) $\frac{R_1 - R_0}{R_0(t_1 - t_2)}$

[KVS JE - 2016]

201. The element which is capable of delivering energy by its own is known as :

(a) Non-liner element (b) Unilateral element

(c) Active element (d) Passive element

[Noida Metro Rail Corporation - 2017]

202. A billion electrons pass through a conductor of cross section in 10^{-3} sec. The current is :

(a) 10^{-7} A (b) 2.6×10^{-3} A

(c) 2×10^{-4} A (d) 1.6×10^{-7} A

[Noida Metro Rail Corporation - 2017]

203. An electric bulb of rating 40 W, 220 V is used for 10 hrs daily for 10 days. Energy consumed is :

(a) 3 kWh (b) 4 kWh (c) 6 kWh (d) 5 kWh

[DMRC JE - 2017]

204. Calculate the power taken by each of the two resistors of value 100 Ω, connected in parallel across 100 V supply :

(a) 1500 W (b) 1.5 W (c) 100 W (d) 2000 W

[DMRC JE - 2017]

205. Find the resistance of an electric heater that absorbs 2400 W when connected to a 120 V supply.

(a) 20 Ω (b) 12 Ω (c) 6 Ω (d) 10 Ω

[Coal India Ltd. - 2017]

206. A circuit contains two unequal resistance in parallel, then :

(a) Large current flows inlarger value resistance

(b) Current is same in both

(c) Smaller current flows in smaller value resistance

(d) Potential difference across each is same

[Coal India Let. - 2017]

207. The resistance R offered by a conductor varies

(a) Directly as its cross sectional area and the resistivity of the material and inversely as its length

(b) Directly as the temperature and cross sectional area of the material and inversely as its length

(c) Directly as its length and cross sectional area of the material and inversely as its resistivity

(d) Directly as the resistivity and length of the material and inversely as its cross sectional area

[LMRC JE - 2016]

208. In a home, with 240 volt AC supply, 5 fans of 60 watt each and 5 tube lights of 40 watt each are used for 5 hours daily. One refrigerator of 120 watt runs for 10 hours daily. Per day energy consumption of the house in kWh will be

(a) 3.7 (b) 620 (c) 3700 (d) 154.16

[LMRC JE - 2016]

209. Three resistors of 4 Ω, 6 Ω and 9 Ω are connected in parallel. Which resistor consumes the maximum power ?
(a) 4 Ω (b) 6 Ω (c) 9 Ω (d) 17 Ω
[Jammu & Kashmir - 2016]

210. Reciprocal of resistance is called
(a) Impedance (b) Conductance
(c) Inductance (d) Sustenances
[Jammu & Kashmir JE - 2016]

211. What would be the total power drawn form the supply, when two heaters, rated at 1000 W, 250 V each are connected in series across a 250 V, 50 Hz supply ?
(a) 1000 W (b) 500 W (c) 250 W (d) 2000 W
[Jammu & Kashmir JE - 2016]

212. What is the dimensional representation of power?
(a) ML^2T^{-3} (b) $M^2L^2T^3$ (c) MLT^{-3} (d) M^2LT^{-3}
[Jammu & Kashmir JE - 2016]

213. A practical voltage source consists of an ideal voltage source in
(a) Series with internal resistance
(b) Parallel with internal resistance
(c) Series with impedance
(d) Series with capacitance
[Jammu & Kashmir JE - 2016]

214. When 'n' resistances each of value 'r' are connected in parallel, then the resultant resistance is 'x'. When these 'n' resistances are connected in series, total resistance is
(a) n^2X (b) X/n (c) n^2/X (d) nX^2
[Jammu & Kashmir - 2016]

215. The resistance/conductance of a material is a function of –
(a) Temperature
(b) Frequency
(c) Both temperature and frequency
(d) None of these
[UPRVUNAL AE - 2014]

216. Two bulbs of 500 W and 200 W rated at 250 V will have resistance ratio as :
(a) 4 : 25 (b) 25 : 4 (c) 2 : 5 (d) 5 : 2
[ESIC JE - 2016]

217. To determine the polarity of the voltage drop across a resistor, it is necessary to know.
(a) value of current through the resistor
(b) direction of current through the resistor
(c) value of resistor
(d) emf in the circuit
[ESIC JE - 2016]

218. Magnitude of the electric shock on human body depend on:
(a) The line voltage
(b) The line current
(c) The line voltage and line current
(d) Current flowing through human body
[FCI - 2015]

219. Resistivity of copper is :
(a) Less then aluminium
(b) More than aluminium
(c) Equal to aluminium
(d) Exactly twice than aluminium
[FCI - 2015]

220. Two bulbs of rating 60 W, 250 V and 100 W, 250 V are connected in series across a supply of 250 V in a room. What will be the total power dissipation in the circuit ?
(a) 37.5 W (b) 60.0 W (c) 100.0 W (d) 160.0 W
[FCI - 2015]

221. Which of the following is not the same as watt ?
(a) Joule/sec (b) $(Ampere)^2 \times$ ohm,
(c) $(Volt)^2$/ohm, (d) Volt/Ampere
[FCI - 2015]

222. For a given voltage, four heating coils will produce maximum heat, when –
(a) All are connected in parallel
(b) All are connected in series
(c) Connected with two parallel pairs in sereis
(d) One pair is connected in parallel with the other two in series
[UPRVUNL AE - 2016, BSNL TTA - 2016]

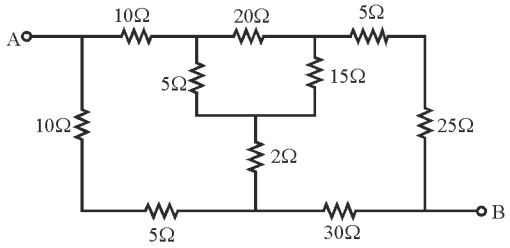
223. A 100 Ω, 1 W resistor and an 800 Ω 2 W resistor are connected in series. The maximum DC voltage that can be applied continuously to the series circuit without weeding the power limit of any of the series resistors is –
(a) 90 V (b) 50 V (c) 45 V (d) 40 V
[UPRVUNL AE - 2016]

224. Two lamps of 100 W and 200 W rated for 220 V are placed in series and a 440 V applied across them, then :
(a) Only 100 W lamp will fuse
(b) Only 200 W lamp will fuse
(c) Both lamps will fuse
(d) No lamps will fuse
[BSNL TTA - 2016]

225. Two resisters are said to be connected in series uniquely if.....
(a) Both carry the same value of current
(b) Total currents is equal to some of both branch current.
(c) Same current passes through both resistor
(d) None of these
[BSNL TTA - 2016]

226. A 12 V source has an internal resistance of 90 Ω. If a load resistance of 20Ω is connected to the voltage source, the load power, P_L will be –
(a) 2.38 mW (b) 2.38 W (c) 238 mW (d) 23.8 W
[BSNL TTA - 2016]

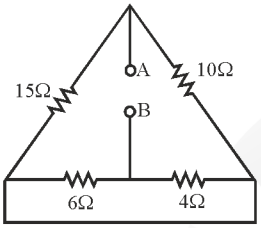
545. Consider the following circuit and determine the equivalent resistance between A and B.



(a) 15.76 Ω (b) 1.63 Ω (c) 23.52 Ω (d) 2.04 Ω

[UPRVUNL-JE-2014]

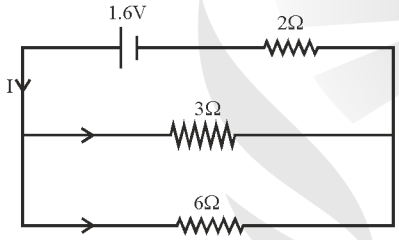
546. In the following circuit, determine the equivalent resistance between A and B.



(a) 8.4 Ω (b) 4 Ω (c) 2.5 Ω (d) 6.8 Ω

[UPRVUNL-JE-2014]

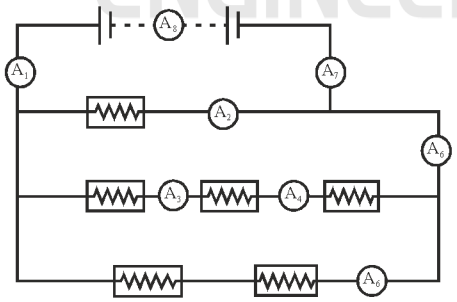
547. Consider the following given circuit and find the value of total current drawn from the cell and the potential difference across the 3Ω resistor respectively.



(a) 0.4 A, 0.8 V (b) 0.84 A, 0.6 V
(c) 0.56 A, 0.8 V (d) 0.9 A, 0.8 A

[UPRVUNL-JE-2014]

548. Consider the following circuit and determine the values of reading on ammeters A_1 through A_8 when it is given that all the resistors have the same value of 10 Ω and Ammeter A_8 reads 11 A.



(a) 11 A, 6 A, 2 A, 2 A, 3 A, 5 A, 11 A, 11 A
(b) 11 A, 16 A, 12 A, 2 A, 3 A, 5 A, 11 A, 11 A
(c) 1 A, 16 A, 12 A, 2 A, 3 A, 5 A, 11 A, 11 A
(d) 11 A, 6 A, 2 A, 12 A, 3 A, 5 A, 11 A, 12 A

[UPRVUNL-JE-2014]

549. To neglect a current source, the terminal across the sources are.
(a) Open circuited
(b) Short circuited
(c) Replaced by some resistance
(d) Replaced by capacitance

[DMRC-JE-2015]

550. Unit of resistivity is:
(a) ohm meter (b) mho meter
(c) mho (d) ohm

[LMRC-JE-2015]

551. Four identical resistors are first connected in parallel and then in series. The resultant resistance of the first combination as compared to the combination will be:–
(a) 1/16 times (b) 1/4 times
(c) 4 times (d) 16 times

[UPPCL-JE-2016]

552. Which of the following statements does not represent ohm's law.
(a) Current / potential difference = constant
(b) Potential difference / current = constant
(c) Potential difference = current × resistance
(d) Current = resistance × potential difference

[UPPCL-JE-2016]

553. How many different combinations may be obtained with three resistors, each having the resistance R?
(a) 3 (b) 4 (c) 5 (d) 6

[UPPCL-JE-2016]

554. Which resistor will be physically larger in size?
(a) 10 Ω, 50 W (b) 100 Ω, 10 W
(c) 1 kil0 Ω, 1 W (d) 10 mega Ω, 1/2 W.

[UPPCL-JE-2016]

555. The work done in moving a unit positive charge between two points in an electric circuit is a measure of–
(a) Current (b) Potential difference
(c) Resistance (d) Power

[UPPCL-JE-2015]

556. The unit of electrical conductivity is:
(a) mho / meter (b) mho / sq. m
(c) ohm / meter (d) ohm / sq. m

[UPPCL-JE-2015]

557. We have three resistor each of value 1 Ω, 2 Ω and 3 Ω. If all the three resistor are to be connected in a circuit, how many different values of equivalent resistance are possible?
(a) Four (b) Six (c) Seven (d) Eight

[UPPCL-JE-2014]

558. A 100 ohm resistor is needed in an electric circuit to carry a current of 0.3 ampere. Which of the following resistor will be suitable for the circuit?
(a) 100 Ω, 2.5 Ω (b) 100 Ω, 5 W
(c) 100 Ω, 7.5 W (d) 100 Ω, 9 W

[UPPCL-JE-2014]

611. The phase angle between the inductor current and the applied voltage is:

(a) 45° (b) 0° (c) 180° (d) 90°

[HMWS-2015]

612. _____is the unit of electric dipole moment.

(a) m/ coulomb (b) Coulomb –m

(c) Coulomb/m² (d) Coulomb / m

[HMWS-2015]

613. If the electrical susceptibility of a particular material is 'Y', then its.

(a) Relative permittivity is Y – 1

(b) Relative permeability is Y – 1

(c) Relative permittivity is Y +1

(d) None of the above

[HMWS-2015]

614. The best material use for standard resistor is.

(a) Platinum (b) Aluminium

(c) Nichrome (d) Manganin

[HMWS-2015]

615. A network contains linear resistors and ideal voltage sources. If values of all the resistors are doubled, then the voltage across each resistor is.

(a) Become half (b) Become double

(c) Increase by four times (d) Not change

[TGENCO -2015]

616. A battery consists of 'n' series connected cells while voltage of each cell is 'v' volts and capacity 'k'. The voltage and capacity of battery is.

(a) Voltage of battery = n * v, Capacity of battery = Capacity of each cell

(b) Voltage of battery = n * v, capacity of battery = n* capacity of each cell.

(c) Voltage of battery = v, capacity of battery = n* Capacity of each cell.

(d) Voltage of battery = v, Capacity of battery = Capacity of each cell.

[TGENCO -2015]

617. In a pure resistive circuit the average power P_{avg} is _____ the peak power P_{max}

(a) Double (b) One half of

(c) One-fourth (d) Equal to

[TSTRANSCO -2015]

618. Four parallel resistors connected in parallel with five series resistors are connected to a dc supply of 210V. If 'R' is resistance of each resistor and supply current is 5A, then the value of 'R' is.

(a) 42 Ω (b) 441/25 Ω

(c) 10 Ω (d) 882/5 Ω

[TSSPDCL -2015]

619. Choose the instantaneous reactive power of a pure capacitive 1–ϕ ac circuit, if V_m, I_m and f are peak voltage, peak current and frequency of sinusoidal supply.

(a) $0.5V_mI_m \sin 4\pi ft$ (b) $-0.5V_mI_m \sin 2\pi ft$

(c) $-0.5V_mI_m \sin 4\pi ft$ (d) $0.5V_mI_m \sin 2\pi ft$

[TSSPDCL -2015]

❑❑❑

ANSWERS AND EXPLANATIONS

1. ***Ans. (a)***

$$R_1 = \frac{R_{ac} \times R_{ab}}{R_{ab} + R_{bc} + R_{ca}}$$

$$= \frac{15 \times 5}{15 + 5 + 30}$$

$$R_1 = \frac{75}{50} = 1.5\Omega$$

$$R_2 = \frac{150}{50} = 3\ \Omega$$

and $$R_3 = \frac{450}{50} = 9\Omega$$

2. ***Ans. (d)***

3. ***Ans. (d)***

$$L \propto N^2$$

$$\therefore \quad N = 2000\sqrt{\frac{5}{3}} = 2582$$

Added number of turns = 582

4. ***Ans. (b)***

(b – n + 1) links associated with fundamental loops.

So, b – n + 1 = 10 – 7 + 1 = 4.

5. ***Ans. (c)***

For maximum i(t)

$$\frac{di(t)}{dt} = 0 = e^{-\alpha t}(1 - \alpha t) = 0$$

$$\Rightarrow \quad t = \frac{1}{\alpha}$$

6. ***Ans. (c)***

Using Y-Δ conversion

$$R_{eff} = \frac{\frac{3}{4}R \times \frac{3}{2}R}{\frac{3}{4}R + \frac{3}{2}R} = \frac{R}{2}$$

7. ***Ans. (c)***

8. ***Ans. (a)***

9. ***Ans. (d)***

10. ***Ans. (a)***

11. ***Ans. (c)***

12. ***Ans. (a)***

13. ***Ans. (b)***

14. ***Ans. (a)***

Total power in parallel circuit

= 40 + 40 = 80 W

15. ***Ans. (d)***

16. ***Ans. (b)***

17. ***Ans. (c)***

18. ***Ans. (a)***

19. ***Ans. (d)***

20. ***Ans. (b)***

21. ***Ans. (c)***

22. ***Ans. (a)***

23. ***Ans. (a)***

24. ***Ans. (c)***

25. ***Ans. (b)***

26. ***Ans. (b)***

27. ***Ans. (d)***

28. ***Ans. (c)***

29. ***Ans. (d)***

30. ***Ans. (d)***

31. ***Ans. (b)***

32. ***Ans. (b)***

33. ***Ans. (b)***

34. ***Ans. (b)***

35. ***Ans. (b)***

36. ***Ans. (c)***

37. ***Ans. (b)***

38. ***Ans. (b)***

39. ***Ans. (b)***

40. ***Ans. (c)***

41. ***Ans. (d)***

42. ***Ans. (d)***

43. ***Ans. (a)***

44. ***Ans. (c)***

$$P_{series} = \frac{V^2}{3R} = 10\ W$$

$$= \frac{V^2}{R} = 30\ W$$

$$P_{parallel} = \frac{3V^2}{R}$$

$$= 3 \times 30 = 90W$$

45. ***Ans. (c)***

$$R_{eq1} = \frac{10 \times 15}{10 + 15} = 6\Omega$$

$$R_{eq} = 12 + 6\Omega = 18\Omega$$

80. ***Ans. (a)***

Total resistance (R_{eq}) $= 3 \parallel 6 + 2$

$$= \frac{3\times 6}{6+3} + 2$$

$$= 4\Omega$$

Total current drawn from the cell

$$= \frac{1.6}{4} = 0.4 \text{ A}$$

$$I_1 = \frac{6}{3+6} \times 0.4 = 0.267 \text{ A}$$

$$V_{3\Omega} = 0.267 \times 3 = 0.8 \text{ V}$$

81. ***Ans. (b)***

Voltage drop per unit length

$$= \frac{2.38}{35} = 0.068 \ \frac{V}{cm}$$

82. ***Ans. (c)***

When the element is having property of internal amplification then element is called as active element.

83. ***Ans. (a)***

84. ***Ans. (d)***

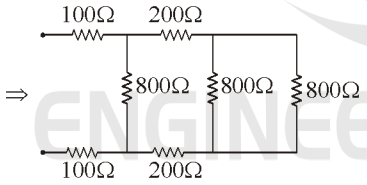
$$R_1 = \frac{20\times 40}{20+40+40} = 8\Omega$$

$$R_2 = \frac{40\times 40}{20+40+40} = 16\Omega$$

$$R_3 = \frac{20\times 40}{20+40+40} = 8\Omega$$

85. ***Ans. (c)***

86. ***Ans. (c)***



$$R_{eq} = 600 \ \Omega$$

87. ***Ans. (c)***

$$R = \frac{\rho l}{a}$$

$$R \propto \frac{1}{a}$$

88. ***Ans. (a)***

89. ***Ans. (b)***

90. ***Ans. (c)***

91. ***Ans. (b)***

92. ***Ans. (a)***

93. ***Ans. (b)***

$$R_{AB} = \frac{20\times 20}{40}$$

$$= 10 \text{ k}\Omega$$

94. ***Ans. (c)***

$$i = \frac{Q}{t} = \frac{0.1}{0.05} = 2A$$

95. ***Ans. (b)***

$$P_{Series} = \frac{P_1 \times P_2}{P_1 + P_2}$$

$$= \frac{200\times 100}{200+100} = 66.6 \text{ W}$$

96. ***Ans. (c)***

$$R_{eq} = 100 + \left(\frac{1}{50} \parallel \frac{1}{75} \parallel \frac{1}{50}\right)$$

$$= 100 + 18.75$$

$$= 118.75 \ \Omega$$

97. ***Ans. (b)***

$$R = \rho \frac{\ell}{a}$$

$$\rho = \frac{R \cdot a}{\ell}$$

$$= \frac{5\times 0.025}{2.2} = 0.057 \ \Omega m$$

98. ***Ans. (c)***

99. ***Ans. (b)***

$$I = \frac{P}{V} = \frac{100}{200} = 0.5 \text{ A}$$

$$n \times 0.5 = 13$$

$$n = 26$$

100. ***Ans. (a)***

Conductance is the measure of how easily electricity or flow of current flows along a certain path through an electrical element conductance $= \frac{1}{\text{Resistance}}$.

101. ***Ans. (a)***

102. ***Ans. (b)***

$$R_t = R_0[1 + \alpha\Delta t]$$

$$16 = R_0[1 + 0.003 \times 50]$$

$$R_o = 13.9 \simeq 14\Omega$$

103. ***Ans. (d)***

$$I = \frac{dq}{dt} \Rightarrow \frac{\text{coulomb}}{\text{sec}}$$

so (d) is correct answer.

171. ***Ans. (a)***

At Balance

$$10 \times 3 = 5 \times D$$

$$D = 6\ \Omega$$

172. ***Ans. (b)***

173. ***Ans. (a)***

In series conn. ; After removing any resistance.

Branch ; Req (↓)

; I (↑)

174. ***Ans. (c)***

$$P_T = 5P$$

$$\Rightarrow \quad P = \frac{10}{5} = 2 \text{ watt.}$$

175. ***Ans. (c)***

$$\text{No. of tree} = (n)^{n-2} = (4)^{4-2} = (4)^2 = 16$$

176. ***Ans. (a)***

177. ***Ans. (b)***

For DC, $f = 0$

$$X_L = 2\pi fL = 0; \text{ short circuit}$$

178. ***Ans. (b)***

179. ***Ans. (b)***

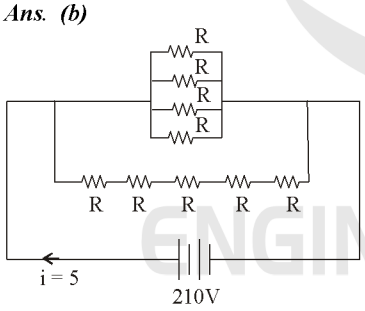
$$V + i = 100 \qquad (V = i \cdot R_L = i \times 1)$$

$$\Rightarrow \quad i + i = 100$$

$$\Rightarrow \quad i = \frac{100}{2} = 50 \text{ Amp.}$$

180. ***Ans. (a)***

181. ***Ans. (b)***



$R_{eq} = 5R \,||\, R/4$

$$R_{eq} = 5R \left\| \frac{R}{4} \right.$$

$$\therefore \quad V = IR_{eq}$$

$$\Rightarrow \quad 210 = 5\left[\frac{5R.\frac{R}{4}}{5R + \frac{R}{4}}\right]$$

$$\Rightarrow \quad R = \frac{4410}{25}\Omega$$

182. ***Ans. (d)***

For h-parameter

$$V_1 = h_{11}I_1 + h_{12}V_2$$

$$I_2 = h_{21}I_1 + h_{22}V_2$$

$$h_{21} = \left.\frac{I_2}{I_1}\right|_{V_2=0}$$

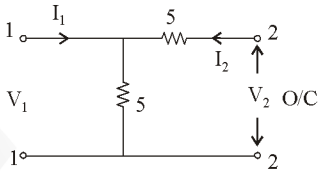
183. ***Ans. (c)***

Node equation = (N – 1)

= (8 – 1)

= 7

184. ***Ans. (d)***

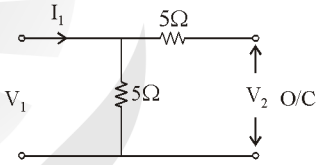


$$V_1 = AV_2 + BI_2$$

$$I_1 = CV_2 + DI_2$$

$$\therefore \quad A = \left.\frac{V_1}{V_2}\right|_{I_2=0}$$

$\therefore$ $I_2 = 0$; O/p port → O/C



$$V_1 = 5\ I_1$$

$$V_2 = 5\ I_1$$

So, $A = 1$

185. ***Ans. (b)***

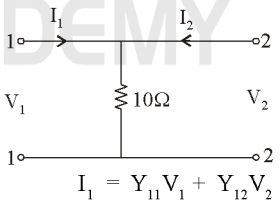
$$L = B - N + 1$$

$$\Rightarrow \quad N = B + 1 - L$$

$$= 12 + 1 - 8 = 5$$

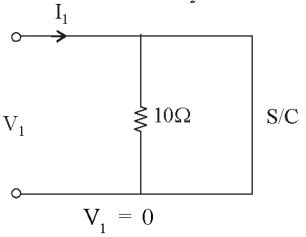
186. ***Ans. (c)***

187. ***Ans. (d)***



$$I_1 = Y_{11}V_1 + Y_{12}V_2$$

So, $Y_{11} = \left.\frac{I_1}{V_1}\right|_{V_2=0}$



$$V_1 = 0$$

188. ***Ans. (a)***

For symm. bilateral N/w

$A = 2, B = 1, C = ?$ &

$A = D = 2$ (symmetrical)

$\therefore \quad AD - BC = 1$

$\Rightarrow \quad (2)(2) - (1)(c) = 1$

$\Rightarrow \quad C = 3$

189. ***Ans. (c)***

190. ***Ans. (d)***

For n-equal resistor having resistance R; Then equivalentf resistor of their parallel combination

$$R_{eq} = \frac{R}{n}$$

So, For $R = 10\ \Omega,\ n = 5$

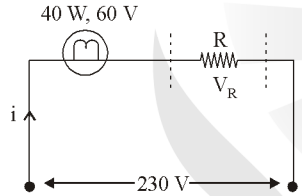
$$R_{eq} = \frac{10}{5} = 2\ \Omega$$

191. ***Ans. (d)***

$$\frac{1}{R_{eq}} = \frac{1}{20} + \frac{1}{100} + \frac{1}{5}$$

$$\Rightarrow \quad R_{eq} = \frac{100}{26} = 3.84\ W$$

192. ***Ans. (b)***



Rated current of bulbs

$$i = \frac{40}{60} = \frac{2}{3}\ \text{Amp.}$$

$V_R = 230 - 60$

$= 170$ Vold.

$V_R = i.R$

$$\Rightarrow \quad R = \frac{170}{\left(\frac{2}{3}\right)} = 255\ \Omega \text{ Ans}$$

193. ***Ans. (b)***

If the length of a wire is stretched by m times with volume remaining same, then area will be $\frac{1}{m}$ times.

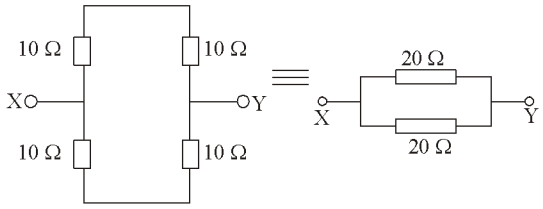
Resisater

$$R = \frac{\delta l}{a}$$

$$R' = \frac{\delta(ml)}{\left(\frac{a}{m}\right)} = \frac{m^2 \delta l}{a}$$

$$\Rightarrow \quad R' = m^2 R$$

194. ***Ans. (c)***



E_q Resistance between X & Y

$= 20 \parallel 20 = 10\ \Omega$

195. ***Ans. (b)***

The terminal voltage will decreases due to voltage drop of service line resistance

196. ***Ans. (d)***

$\therefore \quad P = I^2 R$

$$\Rightarrow \quad I = \sqrt{\frac{P}{R}} = \sqrt{\frac{\frac{1}{2}}{5000}} = 0.01\ \text{Amp}$$

197. ***Ans. (c)***

Resistance of Heater

$$R = \frac{V^2}{P} = \frac{220 \times 220}{1000}$$

$= 48.4\ \Omega$

Now heater is connected across 110 Volt DC.

So, Absorbed power in heater

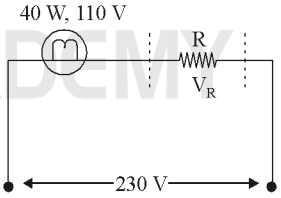
$$P = \frac{(110)^2}{48.4} = 250\ \text{Watt}$$

198. ***Ans. (a)***

Conductance

$$\left(G = \frac{1}{R}\right)$$

199. ***Ans. (a)***



Rated current of Bulb

$$i = \frac{40}{110}\ \text{Amp.}$$

$\therefore \quad V_R = (230 - 110) = 120$ Volt

So, $V_R = 120$

$\Rightarrow \quad i \times R = 120$

$$\Rightarrow \quad R = \frac{120}{\left(\frac{40}{110}\right)} = 330\ \Omega$$

200. ***Ans. (a)***

Resistance of a material dependi upon temperature as follow –

$$R_t = R_0[1 + \alpha\ \Delta t]$$

$$\Rightarrow \quad \frac{R_t}{R_0} - 1 = \alpha\ \Delta\ t$$

$$\Rightarrow \quad \frac{R_t - R_0}{R_0} = \alpha\ (t_2 - t_1)$$

$$\Rightarrow \quad \alpha = \frac{R_t - R_0}{R_0(t_2 - t_1)}$$

201. ***Ans. (c)***

Active element are capable to deliver energy by its own.

Ex. Current source, voltage source etc

202. ***Ans. (d)***

Number of eletrons = 1 billion

$= 1 \times 10^9$

$\therefore \quad q = ne$

$= 1 \times 10^9 \times 1.6 \times 10^{-19}$

$= 1.6 \times 10^{-10}$

$\delta \quad q = i.t.$

$\Rightarrow \quad i = 1.6 \times 10^{-7}$ Amp

203. ***Ans. (b)***

Consumed Energy = Power × time

$= 40\ w \times 10 \times 10\ hr$

$= \frac{4000}{1000}$ kWh

$= 4$ kWh

204. ***Ans. (c)***

$$P = \frac{V^2}{R} = \frac{(100)^2}{100}$$

$= 100$ Watt

205. ***Ans. (c)***

Resistance of heater

$$R = \frac{V^2}{p} = \frac{(120)^2}{2400} = 6\ \Omega$$

206. ***Ans. (d)***

In parallel connection ; voltage will be same

207. ***Ans. (d)***

$$R = \frac{\rho l}{a}$$

208. ***Ans. (a)***

For 5 Fan, 60 W, 5 Hour's per bay

$E_1 = 5 \times 60 \times 5$

$= 1500$ w-hr

For 5 Tubelight, 40w, 5 hr per day

$E_2 = 5 \times 40 \times 5 = 1000$ whr

For Refrigerator 120 Ω, 10 hr daily

$E_3 = 120 \times 10 = 1200$ w-hr

So, per day total Energy Consumption = 1500 + 1000 + 1200

$= 3700$ w-hr

$= 3.7$ kWh

209. ***Ans. (a)***

4 Ω, 6 Ω & 9 Ω are connected in parallel

$$\therefore \quad P = \frac{V^2}{R}\ ;\ V \rightarrow \text{Same}$$

So, 4Ω resistor consumes maximum power

210. ***Ans. (b)***

$$G = \frac{1}{R}$$

211. ***Ans. (b)***

Heater rating → 1000 W, 250 V (each)

For series connection

$$P = \frac{P_1 \times P_2}{P_1 + P_2} = \frac{(1000)(1000)}{2000}$$

$P = 500$ watt

212. ***Ans. (a)***

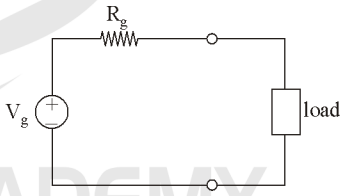
$\therefore \quad P = F \times V$

$P = m^1L^1T^{-2} \times L^1T^{-1}$

$P = m^1L^2T^{-3}$

213. ***Ans. (a)***

Practical voltage source



Rg → int. resistance

214. ***Ans. (a)***

For parallel combination

$$X = \frac{r}{n}$$

For series combination

$$X' = nr$$

So, $$\frac{X}{X'} = \frac{r/n}{nr} = \frac{1}{n^2}$$

$$\Rightarrow \quad X' = n^2X$$

215. ***Ans. (a)***

Resistance depends upon temperature

216. ***Ans. (c)***

$$\therefore \quad P = \frac{V^2}{R} \Rightarrow R = \frac{V^2}{P}$$

So, Resistance ratio of bulb is –

$$\frac{R_1}{R_2} = \left(\frac{V_1}{V_2}\right)^2 \times \frac{p_2}{p_1}$$

$$= \left(\frac{250}{250}\right)^2 \times \frac{200}{500}$$

$$R_1 : R_2 = 2 : 5$$

217. ***Ans. (b)***

218. ***Ans. (b)***

219. ***Ans. (a)***

$(\rho)_{cu} < (\rho)_{Al}$ [Due to Free e^-]

220. ***Ans. (a)***

Two Bulb → 60 W, 250 V and 100 W, 250 V

∴ Rated supply voltage is equal to rated voltage of both bulb which are series connected.

$$\therefore \quad P_T = \frac{P_1P_2}{P_1+P_2}$$

$$= \frac{60\times100}{60+100} = \frac{6000}{160}$$

$$= 37.5 \text{ W}$$

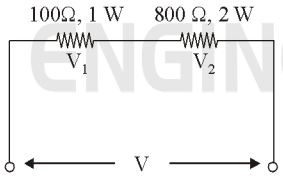
221. ***Ans. (d)***

222. ***Ans. (a)***

When these coil's are connected in parallel connection, then E_q resistance will decreases

and $$\uparrow P = \frac{V^2}{R\downarrow}$$

223. ***Ans. (b)***



$$V = V_1 + V_2$$

$$\therefore \quad P = \frac{V^2}{R}$$

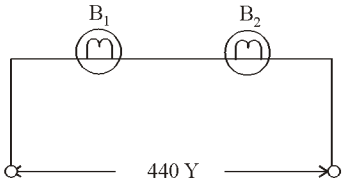
$$\Rightarrow \quad V = \sqrt{P.R}$$

So, $$V = V_1 + V_2$$

$$= \sqrt{100\times1} + \sqrt{800\times2}$$

$$= 10 + 40 = 50 \text{ Volt}$$

224. ***Ans. (a)***



$$B_1 \rightarrow 100 \text{ W}, 220 \text{ V} ; R_1 = \frac{(220)^2}{100} = 484\ \Omega$$

$$B_2 \rightarrow 200 \text{ W}, 220 \text{ V} ; R_2 = \frac{(220)^2}{200} = 242\ \Omega$$

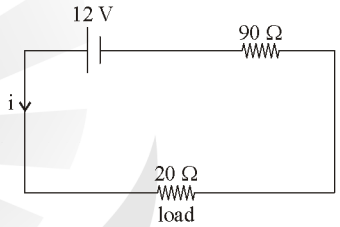
Voltage appear across B_1

$$V_1 = \frac{484}{484+242}\times440 = 293 \text{ volt}$$

Hence voltage across bulb 1 exceed the voltage rating, so bulb get damage.

225. ***Ans. (a&c)***

226. ***Ans. (c)***



$$i = \frac{12}{90+20} = 0.109 \text{ Amp}$$

$$\therefore \quad P_L = i^2 R_L = (0.109)^2 20$$

$$= 0.238 \text{ mW}$$

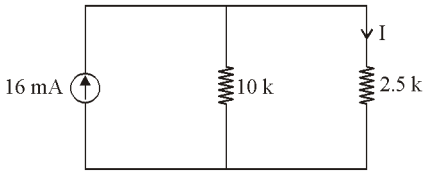
227. ***Ans. (c)***

228. ***Ans. (c)***

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

229. ***Ans. (c)***

230. ***Ans. (d)***



$$I = \left(\frac{10}{10+2.5}\right)16\text{mA}$$

$$I = \frac{160}{12.5}\text{mA}$$

$$= 12.8 \text{ mA}$$

231. ***Ans. (d)***

Current through R_L

$$= \left(\frac{R_S}{Rs+R_L}\right)I_S$$

$$= \left(\frac{12000}{12000+680}\right)1.2$$

$$= 1.14 \text{ Amp}$$

232. ***Ans. (a)***

$$R = \frac{V}{I}$$

$$\therefore \quad V = \frac{W}{Q} = \frac{ML^2T^{-2}}{A^1T^1}$$

$$R = \frac{M^1L^2T^{-3}A^{-1}}{A^1}$$

$$(R) = M^1L^2T^{-3}A^{-2}$$

233. ***Ans. (a)***

Heater $\rightarrow$ 2 kW, 230 V $\rightarrow R_1 = \frac{(230)^2}{2000}$

Filament Bulb $\rightarrow$ 200 W, 230 V $\rightarrow R_2 = \frac{(230)^2}{200}$

$$\therefore \quad R_1 < R_2$$

234. ***Ans. (b)***

$$R_t = R_0(1 + \alpha\,\Delta t)$$

$$R_{50} = R_0\,[1 + \alpha\,(50)]$$

$$R_{100} = R_0\,[1 + \alpha\,(100)]$$

$$\frac{5}{6} = \frac{1+50\alpha}{1+100\alpha}$$

$$\Rightarrow \quad \alpha = \frac{1}{200}$$

So, $\quad R_{50} = R_0\,[1 + \alpha\,(50)]$

$$\Rightarrow \quad R_0 = \frac{5}{1+\left(\frac{1}{200}\right)\times 50} = 4\Omega$$

235. ***Ans. (b)***

$$\therefore \quad R = \frac{V^2}{P} \; ; \; P(\downarrow) : R(\uparrow)$$

For 100 W bulb Filament $\rightarrow$ R ($\downarrow$)

$$\downarrow R = \frac{1}{a\uparrow}$$

$\therefore$ 100 W Filament is thicker.

236. ***Ans. (c)***

For D.C. their will be no change

237. ***Ans. (b)***

$$\alpha = 10^{-3} \text{ per degree}$$

$$= 0.001$$

$$R_0 = 1\ \Omega,\ R_s = 1.1\ \Omega$$

So, $\quad R_t = R_0\,(1 + \alpha\Delta t)$

$$\Rightarrow \quad 1.1 = 1\,[1 + 0.001\,(t)]$$

$$t = 100^\circ \text{ C}$$

238. ***Ans. (b)***

For different power rating equipment.

Rated current is differents

239. ***Ans. (b)***

$$V = I_R = 12 \times 10^{-3} \times 1.2 \times 10^3$$

$$= 14.4 \text{ Volt}$$

240. ***Ans. (b)***

$$R = \frac{V^2}{P} = \frac{(200)^2}{100} = 400\ \Omega$$

241. ***Ans. (b)***

$$V = \text{I.R.} = 200 \times 10^{-3} \times 2 \times 10^3$$

$$= 400 \text{ Volt}$$

$$\text{Load current } I = \frac{400}{100} = 4 \text{ Amp}$$

242. ***Ans. (c)***

$l_1 = l$ and $A_1 = \pi r_1^2$

$l_2 = 2l$ and $A_2 = \pi(r_1/2)^2$

$$= \frac{\pi r_1^2}{4}$$

$$\left(\frac{R_1}{R_2}\right) = \frac{\frac{\delta l}{A_1}}{\frac{\delta 2l}{\frac{A_1}{4}}} = \frac{1}{8}$$

$$\Rightarrow \quad R_2 = 8\,R_1 = 8r$$

243. ***Ans. (a)***

244. ***Ans. (b)***

$$R_1 + R_2 = 9 \qquad \ldots.(1)$$

$$\frac{R_1R_2}{R_1+R_2} = 2$$

$$R_1R_2 = 18 \qquad \ldots\ldots(2)$$

$$R_1 + \frac{18}{R_1} = 9$$

$$\Rightarrow \quad R_1^2 - 9R_1 + 18 = 0$$

$$R_1^2 - 6R_1 - 3R_1 + 18 = 0$$

So $\quad R_1 = 6\Omega$

$$R_2 = 3\Omega$$

245. ***Ans. (d)***

Bulb Resistance

$$R = \frac{(220)^2}{100}$$

When bulb is connected to 110 Volt supply

Then $$P = \frac{(110)^2}{R} = \frac{(110)^2}{(220)^2} \times 100$$

$$P = 25 \text{ Watt}$$

246. ***Ans. (a)***

In series connection low voltage bulb gives more light (glow).

$$P = I^2R \text{ ; in series } I \rightarrow \text{same}$$

$$P \propto R$$

247. ***Ans. (b)***

By current division rule

$$I_1 = \left(\frac{2}{4+2}\right)6 = 2A$$

$$I_2 = 6 - 2 = 4 \text{ A}$$

248. ***Ans. (b)***

$$V_L = L\frac{di}{dt}$$

249. ***Ans. (a)***

250. ***Ans. (a)***

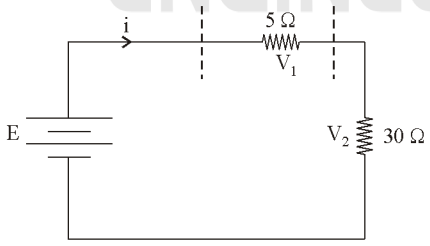
$$R = \frac{\rho l}{a}$$

and $$R = \frac{V}{I} = \frac{1.5}{0.75} = 2\ \Omega$$

So, $$2 = \frac{\rho(5)}{2.5 \times 10^{-7}}$$

$$\rho = 1 \times 10^{-7}\ \Omega\text{-m}$$

251. ***Ans. (b)***



$$E = V_1 + V_2$$

$\therefore$ $$V_1 = 20 = i \times (5)$$

$$i = (4) \text{ Amp.}$$

$\therefore$ $$E = 20 + (4 \times 30)$$

$$= 140 \text{ Volt}$$

252. ***Ans. (a)***

$$G = \frac{1}{R} \text{ ; Siemens is similar to Mho}$$

253. ***Ans. (c)***

254. ***Ans. (b)***

255. ***Ans. (a)***

$$J = \frac{I}{A}; \text{ Amp/m}^2$$

256. ***Ans. (c)***

Extra parrllel load will increase the current form source

257. ***Ans. (d)***

$$i = \frac{Q}{t} = \frac{360}{2 \times 60} \text{ c/sec}$$

$$i = 3 \text{ Amp.}$$

258. ***Ans. (a)***

$\therefore$ $$V_L = L\frac{di}{dt}$$

Inductor will oppose the change in current through it.

$\therefore$ It behaves as open circuit at starting instant

$$i_L(0^+) = i_L'(0^-) = 0$$

259. ***Ans. (d)***

$\therefore$ $$q = i.t$$

$\Rightarrow$ $$i = \frac{q}{t} = \frac{ne}{t}$$

$$i = 10^{20} \times 1.6 \times 10^{-19}$$

$$i = 16$$

260. ***Ans. (a)***

For same electric heater

$R \rightarrow$ constant

$\Rightarrow$ $$\frac{V_1}{I_1} = \frac{V_2}{I_2}$$

$\Rightarrow$ $$\frac{110}{15} = \frac{95}{I_2}$$

$$I_2 = 13 \text{ Amp}$$

261. ***Ans. (a)***

$$P = I^2R$$

$\Rightarrow$ $$I = \sqrt{\frac{P}{R}}$$

$$= \sqrt{\frac{500}{0.001}}$$

$$I = 2236 \text{ Amp}$$

262. ***Ans. (a)***

396. ***Ans. (b)***

$$E = \frac{1}{2}CV^2 = \frac{1}{2}\times 10\times(100)^2$$

$$= 5\times10^4 \text{ J}$$

397. ***Ans. (d)***

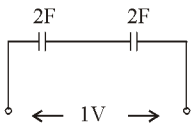
$$C = \frac{\varepsilon_o\varepsilon_r A}{d}$$

$$C \propto A$$

$$C \propto \frac{1}{d}$$

$$C \propto \varepsilon_r$$

398. ***Ans. (a)***



$$Q = C_{eq}V = 1 \times 1$$

$$= 1C$$

399. ***Ans. (d)***

400. ***Ans. (c)***

401. ***Ans. (a)***

Air dielectric strength = 30 kV/cm

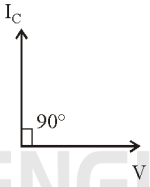
402. ***Ans. (a)***

403. ***Ans. (b)***

404. ***Ans. (d)***

For pure capacitor

Phase different between V & I = 90°

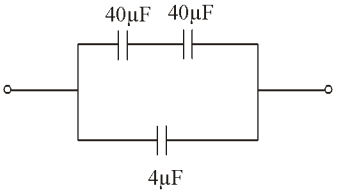


PF = cos90°

= 0 (Leading)

405. ***Ans. (b)***

406. ***Ans. (c)***



$$C_{eq} = 4 + 20$$

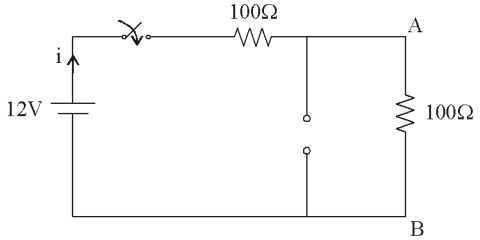
$$= 24 \ \mu F$$

407. ***Ans. (d)***

After long time (At steady state)

Capacitor → open circuit

So,

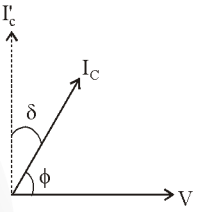


Voltage across capacitor = V_{AB} = 0 Volt

408. ***Ans. (a)***

409. ***Ans. (b)***

410. ***Ans. (b)***



I'_c → For pure capacitor

I_c → For practical capacitor

Loss angle = δ = (90 – ϕ)

411. ***Ans. (c)***

Paschen's Law is an equation that gives the breakdown voltage, that is the voltage necessary to start a discharge or electric arc, between two electrodes in a gas as a function of pressure and gap length.

412. ***Ans. (b)***

$$C_{eq} = \frac{C_1 C_2}{C_1 + C_2} \ ;$$

In series Connection C_{eq} (↓)

413. ***Ans. (a)***

414. ***Ans. (a)***

$$C = C_1 + C_2$$

$$= 20 \ \mu F + 30 \ \mu F = 50 \ \mu F$$

415. ***Ans. (d)***

416. ***Ans. (c)***

417. ***Ans. (c)***

418. ***Ans. (b)***

$$V_{C1} = \frac{\frac{1}{C_1}}{\frac{1}{C_1}+\frac{1}{C_2}}\times 300$$

$$= \frac{10^6}{1\times10^6 + 0.5\times10^6} \times 300$$

$$= \frac{1}{1.5} \times 300 = 200 \text{ V}$$