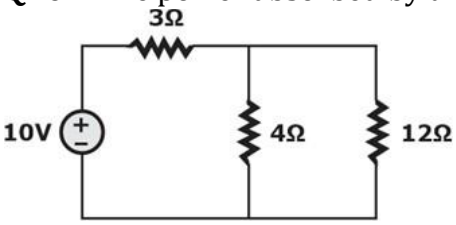
BTSC JE electrical Sample Paper

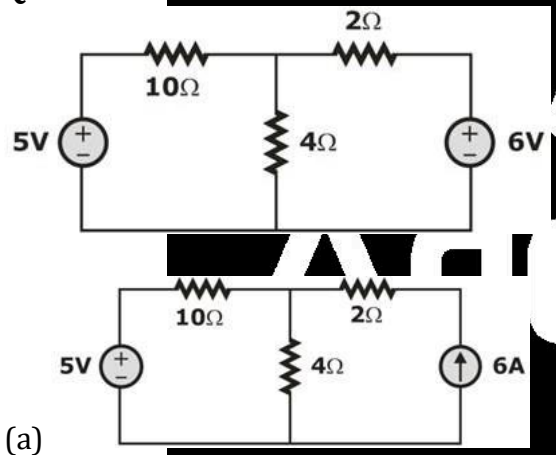
Q101. The power absorbed by the 3Ω resistor in the circuit given below is

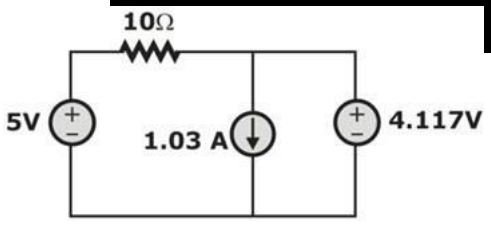


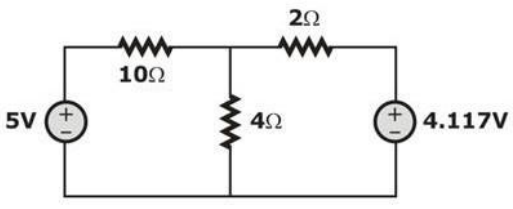
(a) 833W
(b) 83.3 W
(c) 5 W
(d) 8.33 W

Q102. To g[illegible] ndings of its secondary s[illegible]
(a) Delta
(b) Parallel
(c) Star
(d) Series

Q103. Whic[illegible] cuit s[illegible] in fi[illegible]

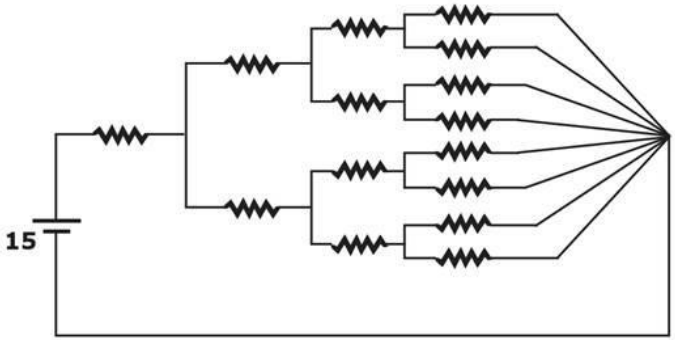
(a)


(b)


(c)


(d) Both (b) and (c)

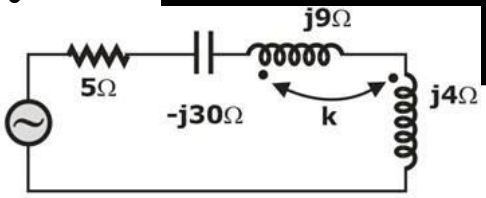
Q104. What is the current supplied by 15 V source when each resistance is 2 ohm?



(a) 4A
(b) 2A
(c) 1A
(d) 3A

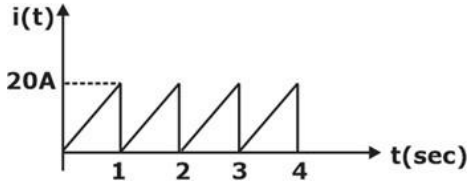
Q105. What ... ted by
v(t) = 50 sin ... sec
(a) 25 V
(b) 14.14 V
(c) 353.5 V
(d) 35.35 V

Q106. What ... in the given circuit



(a) 0.4
(b) 1.416
(c) 0.8
(d) Resonan

Q107. A current waveform is shown below, if it is fed to an ac ammeter, what is the reading shown by the meter?



(a) 20.2 A
(b) 6.65 A
(c) 14.14 A
(d) 11.54 A

Q108. Which of the following theorems can be applied to any network linear or non-linear, active or passive, time variant or time invariant?
(a) Norton theorem
(b) Thevenin theorem
(c) Tellegen theorem
(d) Superposition theorem

Q109. In a series RLC circuit, if $X_C > X_L$, then the
(a) Current and voltage will be in phase
(b) Supply voltage will lead the current
(c) Current
(d) Current

Q110. The S
(a) Coulomb
(b) Ohm
(c) Siemens
(d) Newton

Q111. Whic close ircuit ional to the voltage, pro f the are
(a) Current
(b) Voltage
(c) Kirchhof
(d) Ohm's la

Q112. The p in de ha ed hol v s is
(a) Zero
(b) Same as n th sfac
(c) Less tha
(d) None of

Q113. Para
(a) Slightly less than unity
(b) Slightly more than unity
(c) Equal to unity
(d) Equal to that of ferromagnetic materials

Q114. Which of the following statements is true about magnetic lines of force?
(a) Magnetic lines of force are always closed.
(b) Magnetic lines of force always intersect each other.
(c) Magnetic lines of force tend to crowd far away from the poles of the magnet.
(d) Magnetic lines of force do not pass through the vacuum.

Q115. The RMS value of a half – wave rectified alternating current is 20A. its value for full-wave rectification will be: -

(a) $\frac{40}{\pi}\ A$

(b) $\frac{80}{\pi}\ A$

(c) $\frac{40}{\sqrt{2}}\ A$

(d) 40 A

Q116. The energy used by a 2kW electric iron in 10 minutes is

(a) 120 kJ

(b) 12 kJ

(c) 1200 kJ

(d) 1.2 kJ

Q117. In a c plat will be-

(a) Half

(b) Double

(c) Four tim

(d) No chan

Q118. What having N turns and y current I?

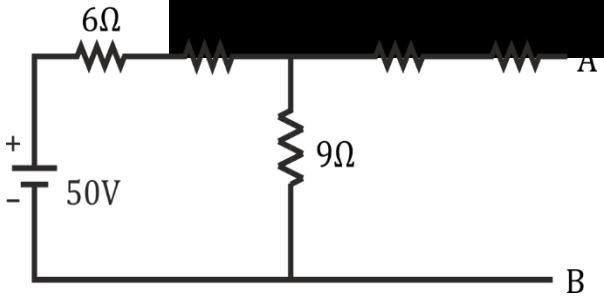
(a) $H = NI\ell$

(b) $H = \frac{NI}{\ell}$

(c) $H = \frac{\ell}{NI}$

(d) $H = \frac{NI^2}{\ell}$

Q119. What en electrical circuit.



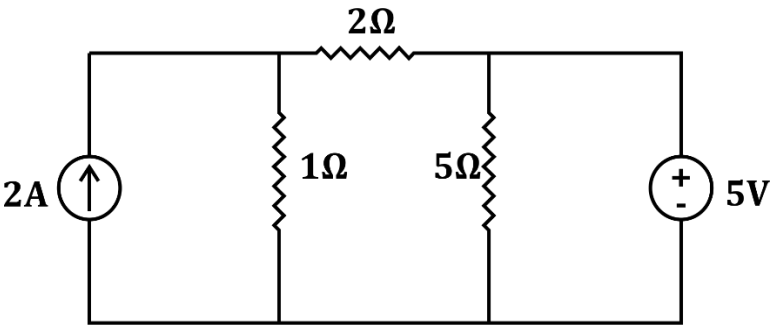
(a) 2.6 Ω

(b) 7.9 Ω

(c) 13.5 Ω

(d) 15.4 Ω

Q120. Determine the current through the 5Ω resistor in the figure given below utilizing Thevenin's theorem.



(a) 1A
(b) 2A
(c) 3A
(d) 4A

Q121. Proxi
(a) Reducing
(b) Reducing
(c) Increasi
(d) Reducing

Q122. A ge m demand of 5 M kW then the load factorw
(a) 0.25
(b) 56
(c) 0.56
(d) 0.65

Q123. The E is used to protect the ?
(a) Alternat
(b) Oil imme
(c) Synchro
(d) Transmission lines against all short circuit faults.

Q124. If for a string insulator system, voltage across bottom last unit is 25% of total string voltage with 5 units; its string efficiency is?
(a) 80%
(b) 85%
(c) 90%
(d) 20%

Q125. The surge impedance of 400 km long overhead transmission line is 300 ohm. For a 200 km length of thesame transmission line surge impedance will be

(a) 150 ohm
(b) 600 ohm
(c) 75 ohm
(d) 300 ohm

Q126. The rated slip of an induction motor at full load is 5% while the ratio of starting current to full load current is four. The ratio of the starting torque to full load torque would be
(a) 0.6
(b) 0.8
(c) 1
(d) 1.4

Q127. What is the angle between stator direct axis and quadrature axis of a reluctance motor?
(a) 0°
(b) 90°
(c) 45°
(d) None of above

Q128. A uni
(a) Low spe
(b) Low tor
(c) High spe
(d) None of

Q129. A 22 ne the rotor speed.
(a) 1455 rp
(b) 728 rpm
(c) 970 rpm
(d) 960 rpm

Q130. Whe from under excitation, a
(a) Increases
(b) Decreases
(c) Remains constant
(d) None of above

Q131. Synchronous motor can be made self-starting by providing
(a) Damper winding on rotor poles
(b) Damper winding on stator
(c) Damper winding on stator as well as rotor poles
(d) None of above

Q132. A 12 Pole, 440V, 50Hz, 3-Phase 5 synchronous motor takes a line current of 100A at 0.8 pf leading Neglecting losses, the torque developed will be?
(a) 750 Nm
(b) 1165 Nm
(c) 1345 Nm
(d) 1236 Nm

Q133. Hunting occurs in….
(a) Synchronous motor
(b) Synchronous generator
(c) Transfor
(d) Both syn

Q134. A syn
(a) P=10, f=
(b) P= 12, f=
(c) P=6, f=5
(d) P= 10, f=

Q135. Wher s swi ed O tic field. The magnitude o
(a) Varies w
(b) Varies w
(c) Constant
(d) None of

Q136. A thr stac ariable eluctan stepp r h s p h e r and stator stack. The st e o his ep r mot s
(a) 6 degree
(b) 9 degree
(c) 12 degre
(d) 18 degre

Q137. The range of efficiency of shaded pole motor is
(a) 90 to 100%
(b) 50 to 70%
(c) 80 to 90%
(d) 5 to 35%

Q138. The highest transmission voltage used in India is
(a) 400 kV
(b) 220 kV
(c) 132 kV
(d) 765 kV

Q139. In AC transmission system the load current is
(a) Independent of power factor
(b) Directly proportional to power factor
(c) Inversely proportional to power factor
(d) None of the above

Q140. Stringing chart represents a graph of _____.
(a) Sag and tension vs temperature
(b) Sag vs supply frequency
(c) Sag vs conductor size
(d) Tension

Q141. In a t
(a) E^2
(b) E
(c) $1/E^2$
(d) $1/E$

Q142. Coro y is _____
(a) 10 times
(b) Infinite
(c) Zero
(d) Less tha

Q143. Amo lowi atemen which ne is tr e
(a) DC trans is ore ffic nt
(b) AC trans n is more fficient
(c) Both are
(d) High vol

Q144. Skin
(a) Supply frequency
(b) Cross-sectional area of the conductor
(c) Permeability of conductor material
(d) All of above

Q145. The inductance of transmission line increase with
(a) Increase in load current carried by the conductor
(b) Increase in spacing between phase conductors
(c) Decrease in line length
(d) None of these

Q146. In AC distribution system the voltage can be controlled by using
(a) Tap changing transformer
(b) Booster transformer
(c) Induction regulator
(d) Any of the above

Q147. Bus Bar is rated by
(a) Voltage only
(b) Current only
(c) Current
(d) Current,

Q148. The s
(a) Armatur
(b) Ward Le
(c) Field div
(d) Armatur

Q149. In a D ng th matu
(a) Constant
(b) Variable
(c) Constant
(d) Variable

Q150. Whic d is NO used for controlling the s of slip ring in on mo
(a) Cascade od
(b) Changin pole thod
(c) Slip pow
(d) Rotor re

Q151. Consider the following statements:
1. Surge impedance of a transmission line is independent of its length.
2. The size of conductor for modern EHV lines is determined on the basis of current density.
3. The insulation of EHV lines is designed on the basis of switching surges.
4. Synchronous compensation is being preferred over static compensation in EHV lines.
Which of the following statement is/are correct?
(a) 1 and 2 are correct
(b) 1 and 3 are correct
(c) 2 and 4 are correct
(d) 3 and 4 are correct

Q152. When the two windings of a transformer are connected electrically, it is called as:
(a) Auto transformer
(b) Two winding transformer
(c) Electrical transformer
(d) Ideal transformer

Q153. A short circuit current in an alternator is
(a) higher when fault occurs away from alternator
(b) higher when fault occurs near to alternator
(c) independent from the distance of fault occurs
(d) None

Q154. Find 92 and base current of 2
(a) 0.15 mA
(b) 0.25 mA
(c) 0.35 mA
(d) 0.75 mA

Q155. _____ ion d e wit
(a) Zener di
(b) Schottky
(c) Tunnel d
(d) None of

Q156. In DC , th rt re s signific tly oc r at:-
(a) the arma y
(b) both the re d p e f es
(c) the yoke
(d) the pole

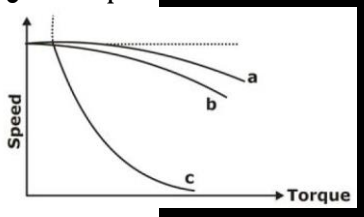
Q157. For a otor is also attached.
The induction motor will now operate a
(a) lagging
(b) leading
(c) reduced power factor
(d) increased power factor

Q158. For a given three-phase induction motor, the slip at full load is
(a) equal to slip at no-load
(b) less than slip at no-load
(c) greater than slip at no-load
(d) equal to zero

Q159. The armature resistance of a DC motor is 0.4, the supply voltage is 200V and the back emf. is 198V at full speed. The armature current is?
(a) 4A
(b) 8A
(c) 5A
(d) 0.5A

Q160. 2's complement of 2's complement of the binary number 10010101 will be
(a) 01101010
(b) 01101011
(c) 1001010
(d) 1001010

Q161. Spee



(a) a
(b) b
(c) c
(d) None of

Q162. A 10 / 1 or t nsformer. A Primary vo 120 applie to th trans W t th on a tage of the transformer
(a) 120V
(b) 12V
(c) 132V
(d) 220V

Q163. Wagner's earth devices are used in AC bridge Circuit for-
(a) Eliminating the effect of earth capacitances
(b) Eliminating the effect of inter component capacitances
(c) Shielding the bridge elements
(d) Eliminating the effect of stray electrostatic fields

Q164. A vector impedance meter measures
(a) The phase angle of the impedance
(b) The power dissipation in the impedance
(c) The magnitude of impedance
(d) Both the magnitude and phase angle of the impedance

Q165. Accuracy of an instrument means _____
(a) Repeatability of the measured value
(b) Closeness of the indicated by it to the correct value of measured
(c) Smallest change in the value of measured that can be detected by the instrument
(d) Speed with which the instruments reading approaches the final value

Q166. If an ammeter is to be used in place of a voltmeter, we must connect with the ammeter a
(a) low resistance in parallel
(b) low resistance in series
(c) high resistance in parallel
(d) high resi

Q167. Whil o wattmeter are equal &
(a) P.F is 0.6
(b) PF is uni
(c) Load is b
(d) The load

Q168. A vol rnal r tanc
(a) Accuracy
(b) Resoluti
(c) Draws sr
(d) Creates l

Q169. An ac nme st hav Resis ance
(a) Very low
(b) Low valu
(c) High valu
(d) None of

Q170. The r be increased by:
(a) connecting a high resistance in series with the instrument
(b) connecting a low resistance in series with the instrument
(c) connecting a low resistance in parallel with the instrument
(d) connecting a high resistance in parallel with the instrument

Q171. Copper shading is provided in energy meter to
(a) To increase speed of aluminium disc
(b) To balance the system from vibration
(c) Bring flux exactly in quadrature with applied voltage
(d) None of the above

Q172. The merging of a free electron and a hole is known as
(a) Recombination
(b) Extrusion
(c) Absorption
(d) Adsorption

Q173. An intrinsic semiconductor has equal number of electrons and holes in it. This is due to
(a) Free electrons
(b) Thermal energy
(c) Doping
(d) Valence

Q174. Resis
(a) Increase
(b) Decreas
(c) First inc
(d) No chan

Q175. The c
(a) Is propo ues o ctric
(b) Is indep
(c) Increase s at higher values
(d) Increase t low values and grad es of electric field.

Q176. The k ge o n and rman n P ction is,
(a) 0.3 V, 0.7
(b) 0.5 V, 0.3
(c) 0.7 V, 0.3
(d) 0.5 V, 0.7

Q177. Whe ng notations would have
(a) Sign magnitude
(b) 1's complement
(c) 2's complement
(d) 9's complement

Q178. What is the decimal equivalent of hexadecimal number 8A7 ?
(a) 1422
(b) 1242
(c) 2114
(d) 2215

Q179. What is the effect of Negative Feedback on the Amplifier?
(a) There is a decrease in the gain of the Amplifier.
(b) There is an increase in frequency.
(c) There is a decrease in Bandwidth.
(d) There is an increase in phase distortion.

Q180. If applied voltage on a motor is 200 volts and back emf is 150 volts, the efficiency of the motor is-
(a) 100%
(b) 80%
(c) 50%
(d) 75%

Q181. A dir s and draws 4 amp curre
(a) 880
(b) 1000
(c) 100
(d) 1100

Q182. Perm known as:
(a) Shunt ex
(b) Series ex
(c) Separate
(d) Compou ion

Q183. In pa peration, ne ge or no ally preferred
(a) Series
(b) Shunt
(c) Under co
(d) Both shu

Q184. In the case of parallel operation of DC compound wound generators for proper division of load from no load to full load it is essential that they should have the same
(a) Series field resistance
(b) Speed of operation
(c) Percentage regulation
(d) None of the above

Q185. A separately excited DC generator has included emf of 250 V and full load terminal voltage of 240 V. if the value of armature resistance is 0.2 Ω. Find the output of generator.

(a) 10 KW
(b) 12 KW
(c) 15 KW
(d) 18 KW

Q186. In a shunt generator the voltage build up is generally restricted by
(a) Saturation of iron
(b) Speed limitation
(c) Armature heating
(d) Insulation restriction

Q187. For a
(a) 6V
(b) 10.23 V
(c) 2 V
(d) 7.8 V

Q188. The t e satur
(a) $\frac{-2I_{DSS}}{V_P}\left[1\right.$
(b) $\frac{-2I_{DSS}}{V_p}\left(1\right.$
(c) $\frac{-2I_{DSS}}{V_p}\left(1\right.$
(d) None of

Q189. For t conf as a c mon mitte Ampli er = 40 and Am p Base current $(I_B) = 25\mu A$ s the va e of mitter urr t (I_E)
(a) 10.25 m
(b) 1.025 m
(c) 102.5 m
(d) 1025 m

Q190. The method suitable for heating of conducting medium is____.
(a) Induction heating
(b) Indirect arc heating
(c) Eddy current heating
(d) Radiant heating

Q191. In an electrical heating process, the high frequency capacitive heating is also known as:
(a) Infrared heating
(b) Dielectric heating
(c) Induction heating
(d) Resistance heating

Q192. For arc heating, the electrodes used are made of
(a) Graphite
(b) Tungsten
(c) Copper
(d) Iron

Q193. The basic elements of an electric drive are
(a) Electric motor and the transmission system
(b) Electric motor, the transmission and control system
(c) The transmission and control system
(d) Electric

Q194. The
(a) It is cum
(b) It is cost
(c) Electric
(d) None of

Q195. In wh
cable is used
(a) Cleat wi
(b) Casing a
(c) Batten w
(d) Conduit

Q196. As pe
(a) 0 to 230 V
(b) 230 V to 6
(c) 650 V to 1
(d) Above 10

Q197. How
(a) One
(b) Two separate and distinct
(c) Three separate and distinct
(d) All of above

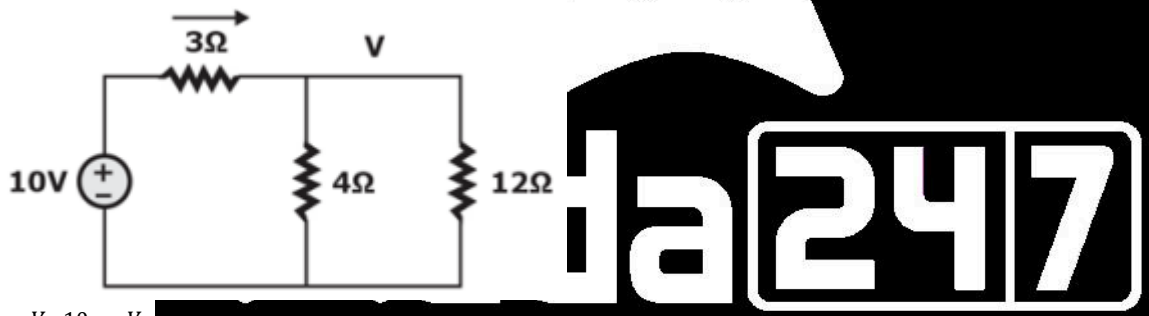
Q198. What is the dimension of the copper strips used for the strip earthing
(a) 25 mm × 4 mm
(b) 25 mm × 3 mm
(c) 25 mm × 2 mm
(d) 25 mm × 1 mm

Q199. To prevent the decaying owing to snow and rain, the wooden poles are protected by _____ cap at the top.
(a) Aluminium
(b) Zinc
(c) Cement
(d) All of above

Q200. The safety factor used for the current rating in a power installation is _____
(a) 0.5
(b) 1
(c) 1.5
(d) 2

SOLUTIONS

S101. Ans.(
Sol.



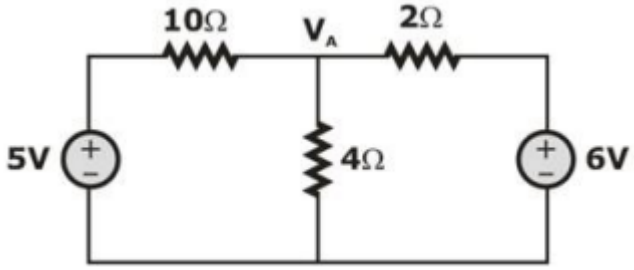
$\frac{V-10}{3}+\frac{V}{4}$
$4V-40$
$V=5$ vo

The current in the resistor 3Ω is $\frac{\quad}{3}=\frac{}{3}$

Power absorbed by 3Ω resistance $= I^2R = \left(\frac{5}{3}\right)^2 \times 3 = 8.33$ W

S102. Ans.(c)
Sol. Delta or Mesh Connection System is also called Three Phase Three Wire System (3-Phase 3 Wire) and it is the best and suitable system for AC Power Transmission. A distribution transformer with a delta primary,
running on three 20kV phases with no neutral or earth required, and a star secondary providing a 3-phase supply at 400 V, with the domestic voltage of 230 available between each phase and an earthed neutral point.

S103. Ans.(b)
Sol.



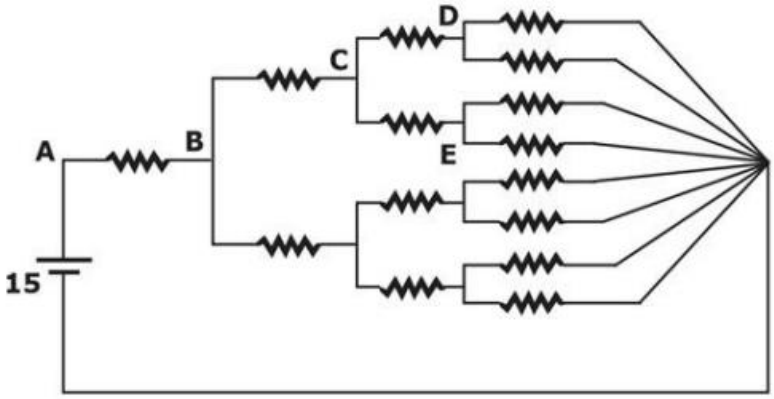
Applying KCL at node A

$\frac{V_A-5}{10}+$

$V_A = 4.$

Current is 4

S104. Ans.(
Sol.



$R_{DF} =$ $2 \| 2 = 1\Omega$

$R_{CF} = ($

$R_{BF} = ($

$R_{AF} = 1$

$i = \frac{15}{3.75}$

$i = 4A$

S105. Ans.(d)
Sol.

Given, $v(t) = 50\sin(13t - 20)V$

at $t = 5$

$v(t) = 50\sin(13 \times 5 - 20)V$

$= 50\sin(65 - 20)V$

$= 50\sin 45°$

$= 35.35$ V

S106. Ans.(d)

Sol. In the circuit

L eq $= L_1 + L_2 + 2m$ ($M =$ mutual inductance)

$m = K\sqrt{L_1 L_2}$

$x_m = \omega m = K\sqrt{\omega L_1 \cdot \omega L_2}$

$= K\sqrt{9 \times 4} = 6K$

Also

$X_L = X_{L1} + X_{L2} + 2X_m = 9 + 4 + 12K$

$= 13 + 12K$

At series res

$X_C = X_$

$30 = 1$

$K = \frac{17}{12}$

which is not

S107. Ans.(

Sol. A.C. am

$I_{\text{rms}} =$

$= \sqrt{\frac{1}{1}\int_0$ $= 11.54$ A

S108. Ans.(

Sol. Telleger m is the th applied t an ne work, wh ear or non-linear, activ ssive, t e-variant or tim invari Tellegen's the m st e the sum of instantaneo er consu ed va io el ments i varia es s ero etwork. This theorem is b on the principle of conservation of energy), which applies to all systems, whether they are linear or

On the othe Thevenin's theorem, ar of resistors, voltage sources, and current sources.

S109. Ans.(d)

Sol. In a series RLC circuit, if $X_C > X_L$, then the Current will lead the supply voltage.

S110. Ans.(c)

Sol. Conductance (G) = $\frac{1}{Resistivity\ (\text{R})}$

$\downarrow$

Unit = $\frac{1}{\text{ohm}}$ (mho or siemen)

S111. Ans.(d)

The law that states that in any closed circuit the current is directly proportional to the voltage, provided the physical conditions of the circuit are kept constant is Ohm's law.

V α I = (physical conditions constant)

⇓

Ohm's law

S112. Ans.(b)

The potential inside a charged hollow sphere is constant and equal to the potential on the surface.

Inside a charge hollow sphere

E = 0

and Electric

So, V = Cons

S113. Ans.(

Sol. Parama slightl tic materials it is less tha

S114. Ans.(

Sol. Magnet sed. ic fie ops, starting from the no uth pole of a magne the negative end of a curr s is bec gnetic do not have any starting

S115. Ans.(

Sol. for HW $= \frac{I_m}{2}$

$\Rightarrow 20 = \frac{I_m}{2}$

$\Rightarrow I_m = 40A$

For FWR: I_r

S116. Ans.(c)

Sol.

Energy = Power × time

$E = 2 \times 1000 \times 10 \times 60$

$E = 2 \times 1000 \times 10 \times 6$

$E = 12{,}00000\ J$

$E = 1200\ kJ$

Alternate information:

$1\ kWh = 3.6 \times 10^6$ Joules

$= 3.6$ Mega Joule

S117. Ans.(c)

Sol.

We know that $C = \frac{Q}{V}$

$$C = \frac{\epsilon_0 A}{d}$$

Where, $A =$ the area of each plate

$d =$ distance between the plate

$C \; \alpha \; A$

If area is four times the capacitance will be four times

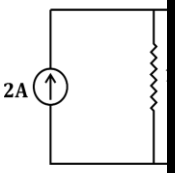
S118. Ans.(

Sol. Field d $= \frac{NI}{\ell}$ (Turn-

Amp/meter

S120. Ans.(

Sol. Remove

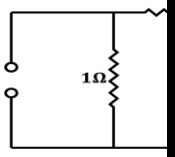


$V_{oc} = 5\ V$

For R_{th}

Current sou

Voltage sou pedances



$R_{th} = 0||3 =$

$\because I_{5\Omega} = \frac{V_{oc}}{R_{th}+}$

$\because V_{th} = 5V$

$R_{th} = 0\Omega$

$I_{5\Omega} = 1A$

S121. Ans.(d)

Sol. It is possible to reduce the proximity effect by reducing the size of the conductor and the frequency and by increasing the voltage and space between conductors.

S122. Ans.(c)

Sol. Given: Maximum load = 5MW, Average load = 2800 kW

Load factor $= \frac{\text{Average load}}{\text{Maximum demand}} = \frac{2800\times10^3}{5\times10^6} = 0.56$

S123. Ans.(b)

Sol. The Buchholz relay is primarily used to protect oil-filled transformers against internal faults, such as faults involving the transformer's insulation or the presence of gases generated due to internal arcing or overheating. Therefore, Oil-immersed transformers against all internal faults is the correct answer.

S124. Ans.(a)

Sol. String efficiency, $\eta = \frac{V}{nV_s} \times 100\%$

$n = 5$

$V_S = 25\%$ of V

(Where V = total string voltage)

So, $\eta =$

$= \frac{1}{5\times0.2}$

S125. Ans.(

Sol. Surge I

Z_0 is not fun

$\therefore Z_o$ will re

S126. Ans.(

Sol.

Full load sli

$\frac{starting\ torqu}{Full-load\ tor}$

$= (4)^2 \times 0.05$

S127. Ans.(

Sol. a reluc ypically 90°. This angle is is is aligned with the st his angular displacemer

S128. Ans.(c)

Sol. universal motors are a type of electric motor that can operate on both AC (alternating current) and DC (direct current) power sources. They are known for their high speed and high torque characteristics, which make them suitable for applications requiring both high rotational speed and high torque output.

S129. Ans.(c)

Sol. Given,

f = 50 Hz

P = 6

S = 3% = 0.03 N_r (Rotor Speed) = ??

Synchronous speed (N_S) = $\frac{120f}{P}$

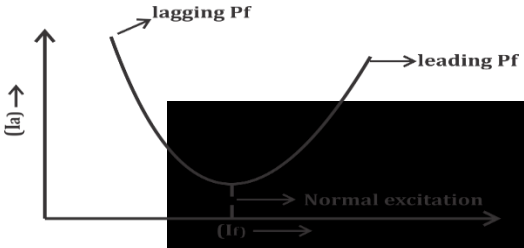
= $\frac{120 \times 50}{6}$ = 1000 rpm

Slip is given as, S = $\frac{N_S - N_r}{N_S}$

0.03 = $\frac{1000 - N_r}{1000} \Rightarrow$ N_r = 970 rpm

S130. Ans.(b)

Sol.



If we increa ition then Pf will increase

S131. Ans.(

Sol. Synchro can be ma per winding on rotor pol s.

Following is win -

(i) Provides

(ii) Reduce

(iii) Used fo

(iv) Under ot carry and current beca y en nd the rotor is zero.

S132. Ans.(

Sol.

Powe

We know that

Synchronous speed (N_s) = $\frac{120f}{P} = \frac{120 \times 50}{12} = 500\ rpm$

Torque developed T = $\frac{P}{\frac{2\pi Ns}{60}} = \frac{60968}{2\pi \times \frac{500}{60}} = 1164.4\ Nm$

S133. Ans.(d)

Sol. On the sudden application of load, the rotor searches for its new equilibrium position and starts oscillating. The phenomenon of oscillation of the rotor about its final equilibrium position is called **Hunting**.

• Hunting is a process occurs in a synchronous motor as well as in synchronous generators on an abrupt change in load.

S134. Ans.(a)

Sol.

$N_S = \frac{120f}{P}$ = 600rpm

If f f=50HZ then P= $\frac{120\times50}{600}$ = 10

If f f=60HZ then P= $\frac{120\times60}{600}$ = 12

S135. Ans.(c)

Sol. When a 3-phase synchronous motor is switched ON, there exists a rotating magnetic field. The magnitude o

S136. Ans.(

Sol.

Step Angle (

m= 3 , N_r= 2

(α)= $\frac{360^\circ}{3\times20}$=6

S137. Ans.(

Sol. A shade cage in w omposed of copper ring of each pole

And their ra 5 to 35%

S138. Ans.(

Sol. In India is th ximum ransmi sion vo a wer G d C ati n s these lines for interstat ur atio th ughou e ntire na ion.

S139. Ans.(

Sol. In AC t factor. The power facto s the power factor decre ersa.

P= $V_L I_L$Cos∅

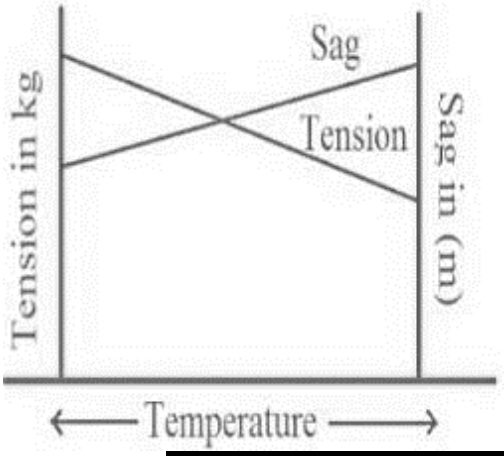
$I_L = \frac{\text{P}}{V_L.\text{Cos}\emptyset}$

$I_L \alpha \frac{1}{\text{Cos}\emptyset}$

S140. Ans.(a)

Sol. Stringing chart gives the data per sag to be allowed and the tension to be allowed in a transmission line for a particular temperature.

It represents a graph of sag and tension V/S temperature.



S141. Ans.(
Sol. In a tra reater is the transmissio used for the conductors.

S142. Ans.(
Sol. The cor rectly pr cy.
P_c(co
for f_c
$\frac{P_{DC}}{P_{AC}}$ =
P_{DC} =
Therefore, c

S143. Ans.(
Sol. High vo C ns iss is m e ficient th n AC t miss o HV voltage DC) transmissio ovide grea stabilit , reliabi ity and nsmissi pa t A h ve more line losses than

S144. Ans.(
Sol. The ski e current to be concentrates near the surface of the conductor, rather than being evenly distributed throughout its cross-section. This effects depends on several factors including.
(a) frequency
(b) permeability of conductor
(c) cross-sectional area of conductor
(d) temperature of the conductor

S145. Ans.(b)
Sol. Inductance of power transmission line increase with increase in spacing between phase conductor.

$$L = \frac{\mu_0}{2\pi}\log\left(\frac{d}{r}\right)$$

S146. Ans.(d)

Sol. In ac distribution system the voltage can be controlled by using

1. Induction regulator
2. Booster transformer
3. Tap changing transformer

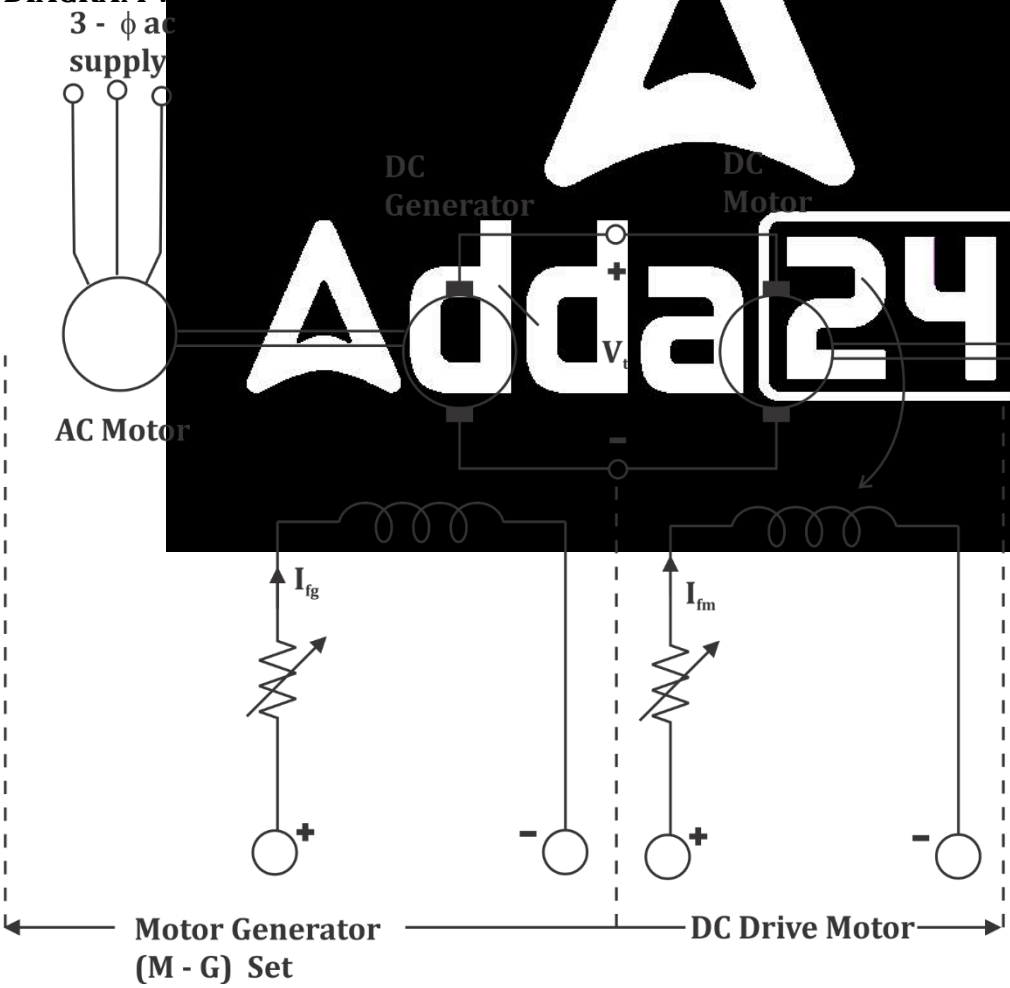
S147. Ans.(d)

Sol. The rating of a bus bar is determined by several factors, including current, voltage, frequency, and short- circuit current.

S148. Ans.(

Sol. The spe ard method. Speed contr ture. Ward-Leonard Sys in 1891. In this system y excited dc generator. T dri n motor or a synchronou ving m the motor-generator (*M*

DIAGRAM V



S149. Ans.(a)

Sol. Speed control by varying the resistance in the armature circuit varies the hardness of the speed–torque characteristics and therefore results in a different stability of operation for a given speed. This type of control is used to reduce the speed below the base speed at constant load torque.

S150. Ans.(b)

Sol. In slip ring induction motor rotor has winding on it. If no of the poles of the stator is changed then then we have to change design of rotor winding to make rotor poles equal to stator winding. Hence, Changing the pole method is not used for controlling the speed of the slip ring induction motor.

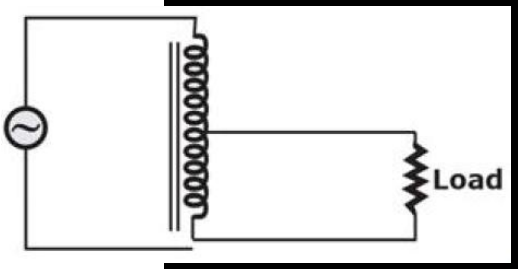
S151. Ans.(

Sol. Surge i

- The insula

S152. Ans.(

Sol.



In an auto t ing i ary y winding. Bu windings are used for d secondary p

Advantage o ansfor

- Its efficie more wh compared with the conve tio
- Its size is ively very smaller.
- Voltage

S153. Ans.(

Sol. As shor

$I_{sc}\ \alpha\ \frac{1}{X_s}$

Where, X_s in inductance of line

When fault is near to alternator, inductance value will be smaller as it is proportional in length of line. Hence, short circuit current will be higher.

S154. Ans.(b)

Sol. Given, base current, I_b = 20 μA

Given, base current, $I_b = 20\mu A$

$\alpha = 0.92$

Collector current, $I_C = bl_b = \frac{\alpha}{1-\alpha} I_b$

$I_C = \frac{0.92}{1-0.92} \times 20\mu A$

$I_C = 230\mu A$

Emitter current, $I_E = I_C + I_b$

$I_E = 230 \times 10^{-6}A + 20 \times 10^{-6}A$

$I_E = 250 \times 10^{-6}A$

$I_E = 0.25mA$

S155. Ans.(b)

Sol. Schottky diode is a metal-semiconductor function diode without depletion layer.

In Schottky

S156. Ans.(

Sol. Core los

in flux linka

S157. Ans.(

Sol. Adding e pf of t otor will still

work at lagg

S158. Ans.(

Sol. For a th e slip at full load i

S159. Ans.(

Sol. For DC

V = 200 V

E = 198 V

R_a = 0.4 ohr

$I_a = \frac{200-198}{0.4}$

S160. Ans.(

Sol. 2's com

2's complem

2's complement of 01101001 = 10010101

So, Ans is 10010101.

S161. Ans.(c)

Sol. Torque of dc series motor , $T = k_a \phi_{se} l_a$

Now $= k_a k_{se} l_a{}^2$

Here $k_a k_{se} = k \rightarrow$ constant

$T = k l_a{}^2$

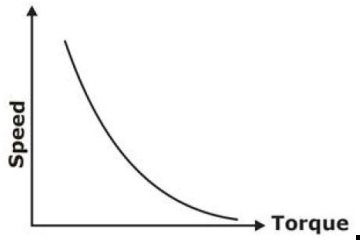
$I_a = \sqrt{\frac{T}{k}}$

Now, $E = V - I_a(R_a + R_{se}) = k_n \phi_{se} N$

$$\Rightarrow N = \frac{V}{k_n \phi_{se}} - \frac{I_n \cdot R_a}{k_n \phi_{se}} \; [R_a = r_a + r_{se}]$$

$$\Rightarrow N = \frac{V}{k_n k_{se}} - \frac{R_a}{k_n k_{se}}$$

There is inverse relation between torque and speed.



S162. Ans.(

Sol. For step

$\frac{120+12}{120} = \frac{132}{120}$

$V_{\text{secondary}} =$

$V_{\text{secondary}} =$

S163. Ans. (is us for tances from the bridges. cuit o red ause of stray capacitance. ovide high accur

S164. Ans.(

Sol. A vecto lance.

→ this meth ine ar tha the ma nit de Z and th angle (O) of the impedan te

S165. Ans.(

Sol. Accura Or it is the closeness w g measured i.e. conform

S166. Ans.(d)

Sol. If an ammeter is to be used in place of a Voltmeter we must connected with ammeter a high resistance in series.

→ since resistance of voltmeter is very high and resistance of ammeter is less so when we replace voltmeter with ammeter we connect high resistance in series to protect ammeter.

S167. Ans.(d)

Sol.

$\phi = \tan^{-1}\left[\sqrt{3}\left(\frac{w_1 - w_2}{w_1 + w_2}\right)\right]$

$W_2 = -W_1$

$\phi = \tan^{-1}\left[\sqrt{3}\left(\frac{w_1 + w_1}{w_1 - w_1}\right)\right]$

$\phi = \tan^{-1}\left[\sqrt{3}\left(\frac{2w_1}{0}\right)\right]$

$\phi = \tan^{-1} \infty$

$\tan \phi = \tan 90°$

$\phi = 90°$

so the load is pure inductive.

S168. Ans.(c)

Sol. voltmeter having high internal resistance so it draws low current and correctly measure the potential di

S169. Ans.(

Sol. An ammeter is an instrument for measuring the electric current in amperes in a branch of an electric circuit. It must be placed in series with the measured branch, and must have very low resistance to avoid significant alteration of the current it is to measure.

S170. Ans.(

Sol. PMMC a

By connecti acr trum

S171. Ans.(

Sol. Copper ding ding gy meter to bring the flu voltage. The purpose of this improve the accuracy of s m ent

S172. Ans.(

Sol.

- When sem uction band, leaving hole
- The orbits nce band.
- one atom's conduction band intersects the enter orbit of another and electron from C.B. falls into a hole as a result of they
- They merge of electron & hole call a Recombination

S173. Ans.(b)

Sol. An intrinsic semiconductor has equal number of electrons and holes in it. This is due to thermal energy. In an intrinsic semiconductor at thermal equilibrium, some electrons from the valence band are thermally excited to the conduction band, creating equal numbers of electrons and holes. This balance is achieved through the energy provided by thermal agitation. It does not depend on factors like free electrons, doping, or the specific characteristics of valence electrons.

S174. Ans.(b)

Sol. by adding impurities Resistance of semiconductor is decrease. Impurities such as Arsenic, Antimony, Phosphorous are added in N-type semiconductors. Impurities such as Aluminium, Gallium and Indium are added in P-type semiconductors.

S175. Ans.(d)

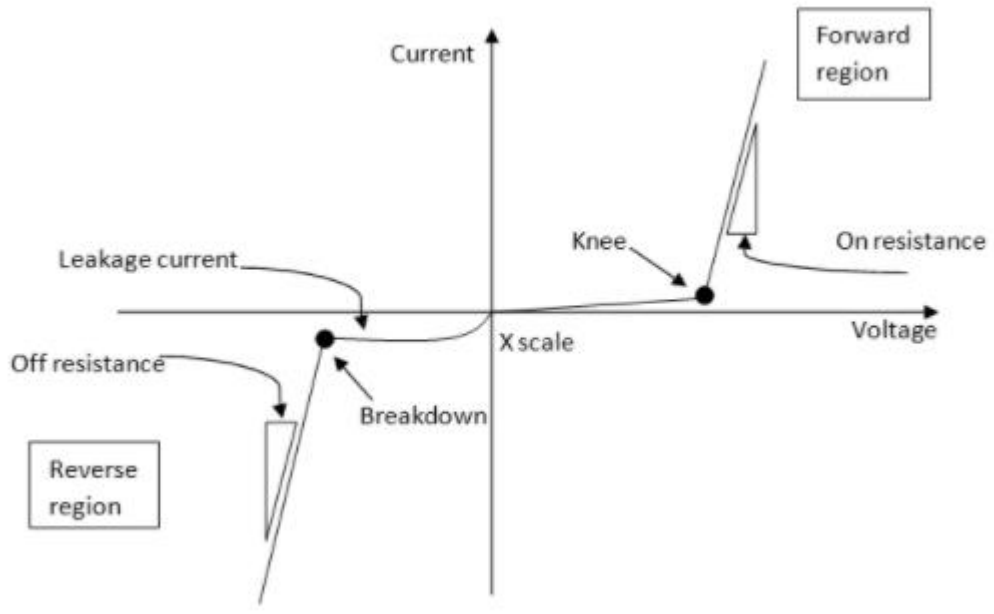
Sol. In silicon, the drift velocity of electrons initially increases linearly with the electric field at lower values of the field strength. However, as the electric field strength increases, the drift velocity begins to saturate and doesn't increase linearly anymore.

S176. Ans.(

Sol. The kn the point at which a PN j

Silicon PN j the voltage reaches app wever, once the applied he c n increases significantly

Germaniu or germa has a lower threshold vo r to s con, I e the voltage reaches app d bi recti occurs after surpassing t



S177. Ans.(c)

Sol. In binary arithmetic, when signed numbers are used, the 2's complement notation has a unique representation for zero. The 2's complement representation is commonly used because it has the advantage of having a unique representation for zero and simplifies arithmetic operations like addition and subtraction.

S178. Ans.(d)

Sol. To convert a hexadecimal number to its decimal equivalent,

8A7 (hexadecimal) = $(8 \times 16^2) + (A \times 16^1) + (7 \times 16^0)$

Now, in hexadecimal, A represents the decimal value 10.

$(8A6)_{16} = (8 \times 256) + (10 \times 16) + (7 \times 1)$

$(8A6)_{16} = 2048 + 160 + 7$

$(8A6)_{16} = (2215)_{10}$

So, the decimal equivalent of the hexadecimal number 8A6 is 2215.

S179. Ans.(c)

Sol. We kno

$A_f =$

Negative fee

S180. Ans.(

Sol. Given, V

$E_b = 150$ V

Power outpu

$\eta\% = \frac{\text{power o}}{\text{Power}}$

S181. Ans.(

Sol.

Given th

$I_a = 4A$

$R_a = 5\Omega$

$V = 220$

$\therefore V = E$

Back emf (E)

$E = 220 - 4$

Input power

$= 200 \times 4 +$

S182. Ans.(c)

Sol. Permanent magnet excitation is also known as Separate excitation. In separate excitation, a separate source of excitation, such as a permanent magnet, is used to create the magnetic field in a DC machine or motor, independent of the armature current. This allows for control of the field strength and, consequently, the motor's performance.

S183. Ans.(d)

Sol. DC shunt & under compound DC generators due to their drooping characteristics are to best suited for parallel operation.

S184. Ans.(c)

Sol. For satisfactory operation, it is durable that all the machines operating in parallel should have same percentage voltage regulation so as to share the total load in proportion to their rated capacity.

S185. Ans.(b)

Sol.

$E_g = 250\ V$ $V_t = 240\ V$

$R_a = 0.2\ \Omega$

$E_g = V_t + I_a R_a$

$250 = 240 + I_a \times 0.2$

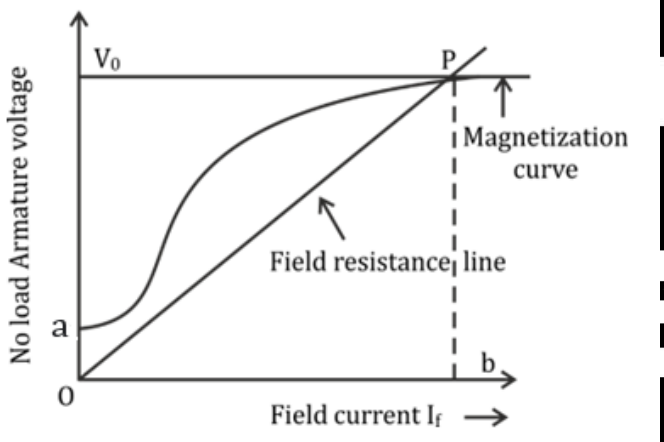
$I_a = \frac{250 - 240}{0.2}$

Output = $V_t I$

$= 240 \times 50 =$

S186. Ans.(

Sol. In a sh gen n. Once the terminal vo will get s any further increase in f



S187. Ans.(

Sol. $V_{GS} = 3V, I_{DSS} = 6A \ and \ I_D = 3A$

$I_D = I_{DS}\left(1 - \frac{V_{GS}}{V_P}\right)^2$

$3 = 6\left(1 - \frac{3}{V_P}\right)^2$

$\frac{3}{6} = \left(1 - \frac{3}{V_p}\right)^2$

$\frac{1}{\sqrt{2}} = 1 - \frac{3}{V_P}$

$1 - \frac{1}{\sqrt{2}} = \frac{3}{V_P}$

$\boxed{V_P = 10.23V}$

S188. Ans.(a)

Sol. Drain to source current is

- $I_{DS} = I_{DSS}\left(1 - \frac{V_{GS}}{V_P}\right)^2$

Transconductance is

- $g_m = \frac{\partial I_D}{\partial V_{GS}}$

$g_m = \frac{-2I_{DSS}}{V_P}\left(1 - \frac{V_{GS}}{V_P}\right)$

S189. Ans.(b)

Sol. Current

Base curren

Emitter cur

$\beta = \frac{I_C}{I_B}$

$I_C = \beta I_B =$

$I_C = 10^{-3}A$

$I_E = I_C + I_B$

$I_E = 1mA +$

S190. Ans.(

Sol. Inducti heating an electrical tromagnetic induction, t e obj urre e for heating of conductin 00 and 300 KHz.

S191. Ans.(

Sol. The p of heatin in hich a igh-freque ab ele fi io waves or microwave om ic radiation are use to hea as dielectric heating.

Dielectric he

S192. Ans.(a)

Sol. graphite is the most commonly used material for arc electrodes due to its high melting point, low reactivity, and ability to conduct electricity. Graphite electrodes are widely used in applications such as steelmaking, metalworking, and glass manufacturing.

Arc heating is a process that involves the use of an electric arc to heat or melt a material. The electric arc is generated between two electrodes, which are typically made of materials that can withstand high temperatures and resist melting or vaporization.

S193. Ans.(b)

Sol. The basic elements of an electric drive are Electric motor, the transmission, and control system.

S194. Ans.(c)
Sol. The main drawback of electric drive is that Electric power supply failure makes the drive standstill.
It has a poor dynamic response
It cannot install where electricity is not available.

S195. Ans.(c)
Sol. Batten wiring is basically an internal wiring system and are of two types:
- CTS or TRS or PVC sheath wiring
- Lead sheathed or metal sheathed wiring

CTS cables are available in single-core, twin-core or three core with a circular or oval in shape.

S196. Ans.(
Sol. As per I
- Low voltag
- Medium vo
- High voltag
- Extra high v

S197. Ans.(
Sol. As per y Ru 1956 eparate and distinct eart
S198. Ans.(
Sol. Copper will be c rrection o

S199. Ans.(
Sol. Wooden sed in ver distribution ystem a ften rotecte d a sed by snow and rain by ric s m ho O e c nm n methods to in ll a ca me p pole. These caps can be of differe materi ls such as mi im, zinc ver c me T rpose of the cap is to pr prevent ng it from seepin e wood and causing dec be used as protective c

S200. Ans.(d)
Sol. The safety factor used for the current rating in a power installation is 2.