TEST – III : GENERAL ENGINEERING (ELECTRICAL)

101. The reactive power generated by a synchronous alternator can be controlled by
(A) changing the prime move input
(B) changing the alternator speed
(C) changing the field excitation
(D) changing the terminal voltage

102. The per phase DC armature resistance of an alternator is 0·5Ω. The effective AC armature resistance would be about
(A) 0·25Ω (B) 0·5Ω
(C) 0·75Ω (D) 1Ω

103. Base load of a power station stands for
(A) 2 – 4 hours/day (B) 4 – 8 hours/day
(C) 8 – 12 hours/day (D) 12 – 24 hours/day

104. If the power factor is high, then the consumer maximum KVA demand
(A) increases (B) decreases
(C) remains constant (D) becomes zero

☆☆ **105.** A circuit breaker is rated as follows : 1500 A, 33 KV, 3 sec., 3-phase oil circuit breaker. Determine the making current.
(A) 1·5 KA (B) 35 KA
(C) 89 KA (D) 110 KA

106. Which of the following fault is coming under symmetrical fault ?
(A) LG fault (B) LL fault
(C) LLG fault (D) LLLG fault

107. If span length is doubled with no change in other factors, the sag of the line will become
(A) 0·5 time (B) 2 times
(C) 4 times (D) 8 times

108. An alternator is supplying a load of 300 kW at a power factor of 0·6 lagging. If the power factor is raised to unity, how many more kW can alternator supply ?
(A) 100 kW (B) 150 kW
(C) 200 kW (D) 300 kW

109. What is the maximum number of point of light, fan and socket-outlets that can be connected in one sub-circuit ?
(A) Four (B) Six
(C) Ten (D) Twelve

110. In dc operation of fluorescent tube, the life of the tube
(A) increases by about 80% as that with ac operation
(B) decreases by about 80% as that with ac operation
(C) remain same
(D) may increase or decrease

111. For painful shock, what is the range of electric shock current at 50 Hz ?
(A) 0 – 1 mA (B) 0 – 3 mA
(C) 3 – 5 mA (D) 5 – 10 mA

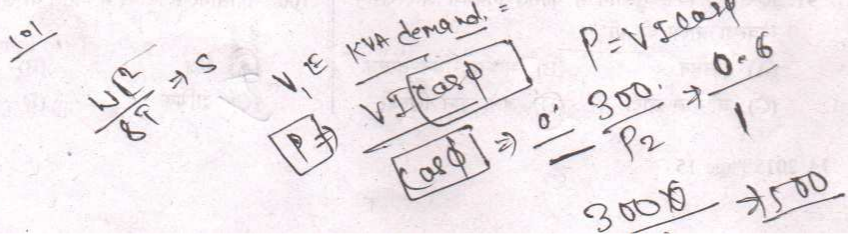
112. The permissible voltage drop from supply terminal to any point on the wiring system should not exceed
(A) 4% + 1 volt (B) 3% + 1 volt
(C) 2% + 1 volt (D) 1% + 1 volt

113. In batton wiring the cables are carried on seasoned teak wood perfectly straight and well varnished teak wood batton of thickness not less than
(A) 1 cm (B) 2 cm
(C) 3 cm (D) 4 cm

114. For cleat wiring and 250 volts supply, the cables will be placed _____ apart centre to centre for single core cables
(A) 2·5 cm (B) 3 cm
(C) 4 cm (D) 4·5 cm

115. The aluminium conductor of size _____ is used for a subcircuit in domestic wiring.
(A) 1/1·2 mm (B) 1/1·4 mm
(C) 1/1·8 mm (D) 1/2·24 mm

SPACE FOR ROUGH WORK



116. If in an RLC series circuit, the frequency is below the resonant frequency, then
(A) $X_C = X_L$ (B) $X_C < X_L$
(C) $X_C > X_L$ (D) None of the above

117. An RLC series circuit has R=10Ω, L= 2 H. What value of capacitance will make the circuit critically damped ?
(A) 0·02 F (B) 0·08 F
(C) 0·2 F (D) 0·4 F

118. When a series RL circuit is connected to a voltage source V at $t = 0$, the current passing through the inductor L at $t = 0^+$ is
(A) $\frac{V}{R}$ (B) infinite
(C) zero (D) $\frac{V}{L}$

119. Three wattmeter method of power measurement can be used to measure power in
(A) Balanced circuits
(B) Unbalanced circuits
(C) Both balanced and unbalanced circuits
(D) None of the above

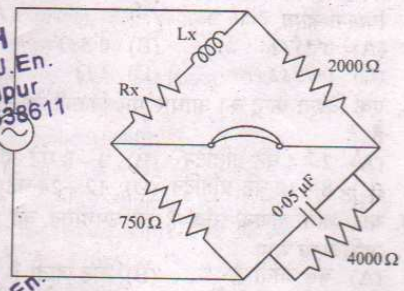
120. In a three phase system, the volt ampere rating is given by
(A) $3\ V_L I_L$ (B) $\sqrt{3}\ V_L I_L$
(C) $V_L I_L$ (D) $V_{ph} I_{ph}$

121. In a parallel RLC circuit if the lower cut-off frequency is 2400 Hz and the upper cut-off frequency is 2800 Hz what is the bandwidth ?
(A) 400 Hz (B) 2400 Hz
(C) 2800 Hz (D) 5200 Hz

122. The errors in current transformers can be reduced by designing them with
(A) high permeability and low loss core materials, avoiding any joints in the core and also keeping the flux density to a low value
(B) using primary and secondary windings as close to each other as possible
(C) using large cross-section for both primary and secondary winding conductors
(D) All of these

123. A CRO screen has ten divisions on the horizontal scale. If a voltage signal $5 \sin(314t + 45°)$ is examined with a line base setting of 5 msec/div, the number of cycle of signal displayed on the screen will be
(A) 0·5 cycle (B) 2·5 cycles
(C) 5 cycles (D) 10 cycles

124.



In the Maxwell bridge as shown in the figure the values of resistance Rx and inductance Lx of a coil are to be calculated after balancing the bridge. The component values are shown in the figure at balance. The values of Rx and Lx will respectively be
(A) 375 ohm, 75 mH
(B) 75 ohm, 150 mH
(C) 37·5 ohm, 75 mH
(D) 75 ohm, 75 mH

125. Creeping in a single phase induction type energy meter may be due to
(A) over compensation for friction
(B) over voltage
(C) vibrations
(D) All of these

126. Which instrument is used to measure the high resistance ?
(A) Kelvin's Double bridge
(B) Wheatstone bridge
(C) Carey-Foster bridge
(D) Megger

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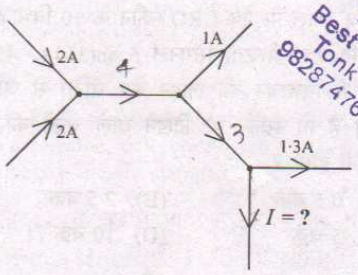
127.



The current I in the electric circuit shown is
(A) 1·7 A (B) 1 A
(C) 2·7 A (D) 3·7 A

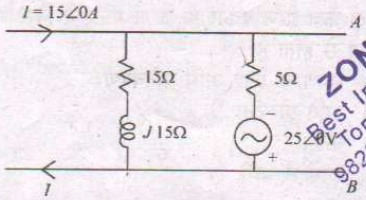
128. The superposition theorem is used when the circuit contains
(A) a single voltage source
(B) a number of voltage sources
(C) passive elements only
(D) active elements only

129. Thevenin's theorem cannot be applied to
(A) active circuit (B) linear circuit
(C) nonlinear circuit (D) passive circuit

130. A node in a circuit is defined as a
(A) closed path
(B) junction of two or more elements
(C) group of interconnected elements
(D) open terminal of an element

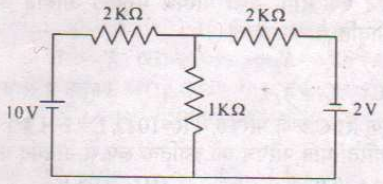
131. When a source is delivering maximum power to the load, the efficiency will be
(A) maximum (B) below 50%
(C) above 50% (D) 50%

132.



For the circuit shown, the Norton's equivalent current source at terminals A & B is given by
(A) $10\angle 0A$ (B) $20\angle 0A$
(C) $16\angle 36\cdot 86A$ (D) $14\angle 36\cdot 86A$

133.



The voltage across the 1 kΩ resistor of the network shown in the given figure is
(A) 6 V (B) 4 V
(C) 2 V (D) 1 V

134. The internal resistance of a voltage source is 10Ω and has 10 volts at its terminals. Find the maximum power that can be transferred to the load.
(A) 0·25 W (B) 25 W
(C) 2·5 W (D) 5 W

135. Mutual inductance between two coils is 4 H. If current in one coil changes at the rate of 2 A/sec, then emf induced in the other coil is
(A) 8 V (B) 2 V
(C) 0·5 V (D) 5·0 V

136. If the number of turns of a coil is increased, its inductance
(A) remains the same
(B) is increased
(C) is decreased
(D) None of the above

137. The e.m.f. induced in a coil of N turns is given by
(A) $\frac{d\phi}{dt}$ (B) $N\frac{d\phi}{dt}$
(C) $-N\frac{d\phi}{dt}$ (D) $N\frac{dt}{d\phi}$

138. When the current through the coil of an electromagnet reverses, the
(A) direction of the magnetic field reverses
(B) direction of the magnetic field remains unchanged
(C) magnetic field expands
(D) magnetic field collapses

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139. A short shunt compound generator supplies a load current of 100 A at 250 V. The generator has the following winding resistances : shunt field = 130Ω, armature = 0·1Ω and series field = 0·1Ω. Find the emf generated if the brush drop is 1 V per brush
(A) 262·0 volt (B) 262·2 volt
(C) 272·0 volt (D) 272·2 volt

140. As the load is increased, the speed of a dc shunt motor
(A) increases proportionately
(B) remains constant
(C) increases slightly
(D) reduces slightly

141. The *Ta Vs Ia* graph of a dc series motor is a
(A) parabola from no load to over load
(B) straight line throughout
(C) parabola throughout
(D) parabola up to full load and a straight line at over load

142. The purpose of starting winding in a single-phase induction motor is to
(A) Reduce losses
(B) Limit temperature rise of the machine
(C) Produce rotating flux in conjunction with main winding
(D) Increase losses

143. Which of the following motors is used in mixies ?
(A) Repulsion motor (B) Reluctance motor
(C) Hysteresis motor (D) Universal motor

144. The motor used on small lathes is usually
(A) universal motor
(B) D.C. shunt motor
(C) single phase capacitor run motor
(D) 3-phase synchronous motor

145. Which of the following motors is preferred for tape-recorders ?
(A) Shaded pole motor
(B) Hysteresis motor
(C) Two valve capacitor motor
(D) Universal motor

146. Locked rotor current of a shaded pole motor is
(A) equal to full load current
(B) less than full load current
(C) slightly more than full load current
(D) several times the full load current

147. Each of the following statements regarding a shaded pole motor is true *except*
(A) its direction of rotation is from unshaded to shaded portion of poles
(B) it has very poor efficiency
(C) it has very poor power factor
(D) it has high starting torque

148. Synchronous impedance method of finding voltage regulation of an alternator is called pessimistic method because
(A) it is simplest to perform and compute
(B) it gives regulation value higher than is actually found by direct loading
(C) armature reaction is wholly magnetising
(D) it gives regulation value lower than is actually found by direct loading

149. Which of the following motor is non-self starting ?
(A) Squirrel cage induction motor
(B) Slip ring induction motor
(C) Synchronous motor
(D) DC series motor

150. A salient-pole synchronous motor is operating at $\frac{1}{4}$ full-load. If its field current is suddenly switched off, it would
(A) stop running
(B) continue to run at synchronous speed
(C) run at sub-synchronous speed
(D) run at super-synchronous speed

151. A 10 pole 25 Hz alternator is directly coupled to and is driven by 60 Hz synchronous motor then the number of poles in a synchronous motor are
(A) 48 poles (B) 12 poles
(C) 24 poles (D) None of the above

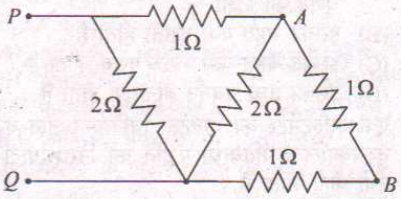
SPACE FOR ROUGH WORK

152. If two capacitances C_1 and C_2 are connected in parallel then the equivalent capacitance is given by

(A) C_1C_2 (B) $\frac{C_1}{C_2}$

(C) $\frac{C_1C_2}{C_1+C_2}$ ● C_1+C_2

153.



For the circuit shown find the resistance between points P & Q.

● 1Ω (B) 2Ω (C) 3Ω (D) 4Ω

154. A resistor is connected across a 50 V source. The current in the resistor if the colour code is red, orange, orange, silver is

(A) 2 mA ● 2·2 mA

(C) 214 mA (D) 21·4 mA

155. A primary cell has an e.m.f. of 1·5 V. When short circuited, it gives a current of 3 A. The internal resistance of cell is

(A) $4{\cdot}5\Omega$ (B) 2Ω

(C) $0{\cdot}2\Omega$ ● $0{\cdot}5\Omega$

156. Electrical resistivity ρ is

● Low for copper and high for alloy

(B) High for copper and low for alloy

(C) Low for copper as well as for alloy

(D) High for copper as well as for alloy

157. The rate of change of current in a 4 H inductor is 2 Amps/sec. Find the voltage across inductor.

● 8 V (B) 0·8 V

(C) 2 V (D) 16 V

158. How much energy is stored by a 100 mH inductance when a current of 1 A is flowing through it ?

(A) 0·5 J ● 0·05 J

(C) 0·005 J (D) 5·0 J

159. What is the Power consumed by the resistor of 20Ω connected across 100 V source ?

● 500 W (B) 50 W

(C) 100 W (D) 300 W

160. A linear circuit is one whose parameters

(A) change with change in current

(B) change with change in voltage

● do not change with voltage and current

(D) None of the above

161. An active element in a circuit is one which

● supplies energy

(B) receives energy

(C) dissipates energy

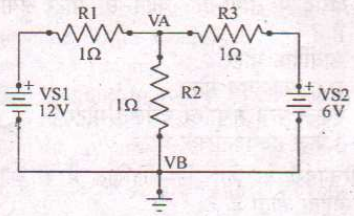
(D) both receives and supplies energy

162. If 750 μA is flowing through 11 kΩ of resistance, what is the voltage drop across the resistor ?

● 8·25 V (B) 82·5 V

(C) 14·6 V (D) 146 V

163.



Find the node voltage V_A.

● 6 V (B) 5 V

(C) 5·66 V (D) 6·66 V

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V = IR

164. The minimum area of cross-section of a three and half core cable should be

(A) 30 cm^2 (B) 40 cm^2
(C) 50 cm^2 (D) 60 cm^2

165. The acceptable value of grounding resistance for domestic applications is

(A) 0·5 Ω (B) 1 Ω
(C) 1·5 Ω (D) 2 Ω

166. Humans are more vulnerable to electric shock current at

(A) 40 Hz (B) 45 Hz
(C) 48 Hz (D) 50 Hz

167. A 200 V lamp takes a current of 1 A, it produces a total flux of 2,860 lumens. The efficiency of the lamp is

(A) 9·9 lumens/W (B) 8·9 lumens/W
(C) 10·9 lumens/W (D) 14·3 lumens/W

168. The unit of luminous flux is

(A) steradian (B) candela
(C) lumen (D) lux

169. An electric heater draws 3·5 A from a 110 V source. The resistance of the heating element is approximately

(A) 385 Ω (B) 38·5 Ω
(C) 3·1 Ω (D) 31 Ω

170. During the resistance welding, the heat produced at the joint is proportional to

(A) I^2R (B) Voltage
(C) Current (D) Volt-Ampere

171. An arc blow is a welding defect that is countered with the help of carrying

(A) the arc welding using AC supply
(B) the thermit welding
(C) the arc welding using DC supply
(D) the resistance welding

172. The electric drives posses the following drawback

(A) not available with various rating
(B) requires a continuous power supply
(C) requires hazardous fuel requirement
(D) not adoptable to various environments

173. An amplifier has a gain of 10,000 expressed in decibels the gain is

(A) 10 (B) 40 (C) 80 (D) 100

174. Silicon has a preference in IC technology because

(A) it is an indirect semiconductor
(B) it is a covalent semiconductor
(C) it is an elemental semiconductor
(D) of the availability of nature oxide SiO

175. To operate properly, a transistor's base-emitter junction must be forward biased with reverse bias applied to which junction ?

(A) Collector-emitter (B) Base-collector
(C) Base-emitter (D) Collector-base

176. With the positive probe on an NPN base, an ohmmeter reading between the other transistor terminals should be

(A) Open (B) Infinite
(C) Low resistance (D) High resistance

177. In Bipolar Junction transistors, the type of configuration which will give both voltage gain and current gain is

(A) CC (B) CB
(C) CE (D) None

178. To prepare a *P* type semiconducting material the impurities to be added to silicon are

(A) Boron, Gallium
(B) Arsenic, Antimony
(C) Gallium, Phosphorous
(D) Gallium, Arsenic

SPACE FOR ROUGH WORK

179. The unit for permeability is

(A) $Wb/At \times m$ (B) At/m

(C) At/Wb (D) Wb

180. If the co-efficient of coupling between two coils is increased, mutual inductance between the coils

(A) is decreased

(B) is increased

(C) remains unchanged

(D) changes depends on current only

181. The magnitude of AT required to establish a given value of flux in the airgap will be much greater than that required for iron part of a magnetic circuit, because

(A) air is a gas

(B) air is a good conductor of magnetic flux

(C) air has the lowest relative permeability

(D) iron has the lowest permeability

182. The area of the hysteresis loop will be least for one of the following materials ?

(A) wrought iron (B) hard steel

(C) silicon steel (D) soft iron

183. A current of 2 A passes through a coil of 350 turn wound on a ring of mean diameter 12 cm. The flux density established in the ring is 1·4 wb/m^2. Find the value of relative permeability of iron.

(A) 191 (B) 600

(C) 1200 (D) 210×10^3

184. A bar of iron 1 cm^2 in cross-section has 10^{-4} wb of magnetic flux in it. If $\mu r = 2000$ what is the magnetic field intensity in the bar ?

(A) 398×10^{-4} AT/m (B) 398 AT/m

(C) 796×10^3 AT/m (D) 398×10^4 AT/m

185. One sine wave has a period of 2 ms, another has a period of 5 ms, and other has a period of 10 ms. Which sine wave is changing at a faster rate ?

(A) Sine wave with period 2 ms

(B) Sine wave with period of 5 ms

(C) All are at the same rate

(D) Sine wave with period of 10 msec

186. In a pure inductive circuit if the supply frequency is reduced to $\frac{1}{2}$, the current will

(A) be reduced by half

(B) be doubled

(C) be four times as high

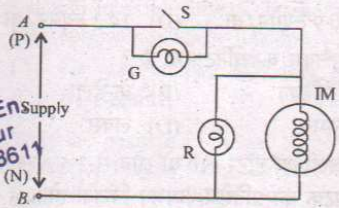
(D) be reduced to one fourth

187. There are 3 lamps 40 W, 100 W and 60 W. To realise the full rated power of the lamps they are to be connected in

(A) series only (B) parallel only

(C) series-parallel (D) series or parallel

188.



Two lamps, Green (G) and Red (R) are connected in a motor circuit as shown in the figure. The conditions under which the lamps will burn are, (supply is available at terminals A & B)

(A) Green lamp burns always, red lamp burns only when switch S is closed

(B) Green and red lamp burns when switch S is closed

(C) Green lamp will not burn always, red lamp burns only when switch S is closed

(D) Green lamp burns only when S is open and red lamp burns only when S is closed.

SPACE FOR ROUGH WORK

189. Modern electronic multimeters measure resistance by
(A) using a bridge circuit
(B) using an electronic bridge compensator for nulling
(C) forcing a constant current and measuring the voltage across the unknown resistance
(D) using an electrical bridge circuit

190. If a dynamometer type wattmeter is connected in an ac circuit, the power indicated by the wattmeter will be
(A) Volt ampere product
(B) Average power
(C) Peak power
(D) Instantaneous power

191. A 150 V moving iron voltmeter of accuracy class 1·0 reads 75 V when used in a circuit under standard conditions. The maximum possible percentage error in the reading is
(A) 0·5 (B) 1·0
(C) 2·0 (D) 4·0

192. A dc voltmeter has a sensitivity of 1000 Ω/volt. When it measures half full scale in 100 V range, the current through the voltmeter will be
(A) 100 mA (B) 50 mA
(C) 1 mA (D) 0·5 mA

193. A Lissajous pattern on an oscilloscope has 5 horizontal tangencies and 2 vertical tangencies. The frequency of the horizontal input is 100 Hz. The frequency of the vertical input will be
(A) 400 Hz (B) 2500 Hz
(C) 4000 Hz (D) 5000 Hz

194. The no load input power to a transformer is practically equal to _____ loss in the transformer.
(A) Iron (B) Copper
(C) Eddy current (D) Windage

195. The primary and secondary windings of a transformer are wound on the top of each other in order to reduce
(A) iron losses
(B) copper losses
(C) leakage reactance
(D) winding resistance

196. Leakage flux in a transformer occurs because
(A) iron core has high permeability
(B) air is not a good magnetic insulator
(C) applied voltage is sinusoidal
(D) transformer is not an efficient device

197. The no load primary current I_0, is about _____ of full load primary current of a transformer.
(A) 3 – 5% (B) 15 – 30%
(C) 30 – 40% (D) Above 40%

198. Which of the following Braking is not suitable for motors ?
(A) Dynamic braking
(B) Plugging
(C) Regenerative braking
(D) Friction braking

199. An eight pole wound rotor induction motor operating on 60 Hz supply is driven at 1800 rpm by a prime mover in the opposite direction of revolving magnetic field. The frequency of rotor current is
(A) 60 Hz (B) 120 Hz
(C) 180 Hz (D) 200 Hz

200. If stator voltage of a squirrel cage induction motor is reduced to 50 per cent of its rated value, torque developed is reduced by how many percentage of its full load value ?
(A) 50% (B) 25%
(C) 75% (D) 57·7%

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