SSC Junior Engineers Exam

ELECTRICAL ENGINEERING

Solved Original Question Paper - 2018

Duration :- 2Hours
Max.Marks :- 200

Held on :- 22.01.2018

Test - I General Intelligence & Reasoning

1. In the following question, select the related word pair from the given alternatives.

Rain : Clouds : : ? : ?

A) Rice : Food

B) Grey : Colour

C) Heat : Sun

D) Snow : Mountains

Explanation: **Ans: (C)**

Cloud is the source of rain.

Similarly, Sun is the source of heat.

2. In the following question, select the related word from the given alternatives.

Cactus : Plant : : Rice : ?

A) Basmati **B)** Crop

C) White **D)** Rabi

Explanation: **Ans: (B)**

Cactus belongs to the class of plant.

Similarly, Rice belongs to the class of crop.

3. In the following question, select the related word from the given alternatives.

Pink : Colour : : Eagle : ?

A) Black

B) Symbol

C) Bird

D) Sky

Explanation: **Ans: (C)**

Pink is one of the colour.

Similarly, Eagle is one of the bird.

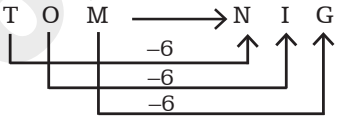
4. In the following question, select the related letter pair from the given alternatives.

TOM : NIG : : ? : ?

A) EAT : YUN **B)** EAT : XXM

C) FAT : LMV **D)** EAT : ZXC

Explanation: **Ans: (A)**



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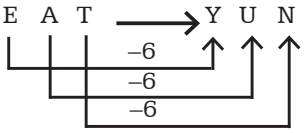


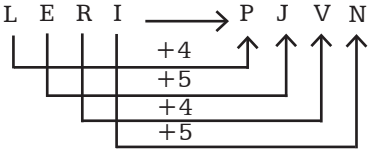
5. In the following question, select the related letters from the given alternatives.

LERI : PJVN : : MONT : ?

A) WRTY **B)** QTRY

C) RITY **D)** RQYB

Explanation: **Ans: (B)**



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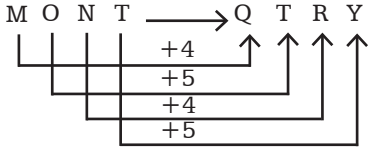


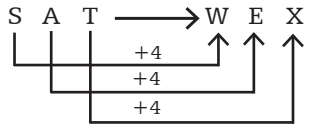
6. In the following question, select the related letters from the given alternatives.

SAT : WEX : : MET : ?

A) AQI **B)** IYX

C) FHY **D)** QIX

Explanation: **Ans: (D)**



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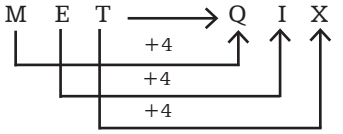


7. In the following question, select the related number from the given alternatives.

43 : 7 : : 23 : ?

A) 6 **B)** 4

C) 7 **D)** 5

Explanation: **Ans: (D)**

4 + 3 = 7,

Similarly, 2 + 3 = 5

8. In the following question, select the related number from the given alternatives.

38 : 53 : : 53 : ?

A) 72 **B)** 68

C) 79 **D)** 87

Explanation: **Ans: (B)**

The difference of 53 and 38 = 15

Similarly, the difference of 68 and 53 = 15

9. In the following question, select the related number from the given alternatives.

9 : 81 : : 11 : ?

A) 78 **B)** 93

C) 121 **D)** 146

Explanation: **Ans: (C)**

$9^2 = 81$; $11^2 = 121$

10. In the following question, select the odd word from the given alternatives.

A) Goggle

B) Purse

C) Accessories

D) Belt

Explanation: **Ans: (C)**

Except Accessories, all other options are single product. But accessories is a group of product.

11. In the following question, select the odd word from the given alternatives.

A) Grapes **B)** Guava

C) Cauliflower **D)** Orange

Explanation: **Ans: (C)**

Except Cauliflower, all other options are fruits.

12. In the following question, select the odd word from the given alternatives.

A) Sparrow

B) Rat

C) Ostrich

D) Parrot

Explanation: **Ans: (B)**

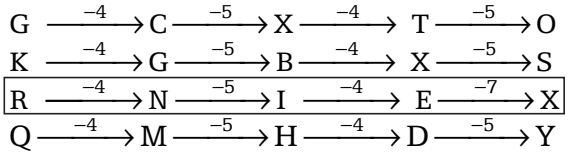
Except Rat, all other options are birds.

13. In the following question, select the odd letters from the given alternatives.

A) GCXTO **B)** KGBXS

C) RNIEX **D)** QMHDY

Explanation: **Ans: (C)**



TEST - III - GENERAL ENGINEERING - ELECTRICAL

101. Why are same types of cells connected in parallel?

A) To decrease the voltage rating
B) To increase the voltage rating
C) To decrease the current rating
D) To increase the current rating

Ans: (B)

102. There are N resistances, each are connected in parallel having value R with equivalent resistance of X. What will be the total resistance when these N resistances are connected in series?

A) NX **B)** RNX
C) $\frac{X}{N}$ **D)** N^2X **Ans: (D)**

103. Which of the following is equivalent to 0.5 kWh?

A) 1800000 W **B)** 1800000 J
C) 18000000 J **D)** 36000000 J

Ans: (B)

104. What is the conductivity (in Mhos/m) of a 2 Ohm circular wire, when the length and the diameter of the wire are 10 m and 0.8 m respectively?

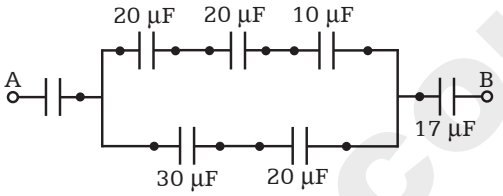
A) 10 **B)** 1
C) 0.1 **D)** 5 **Ans: (A)**

105. 'Erg' is a unit of measurement for _____.

A) Energy **B)** Power
C) Voltage **D)** Impedance

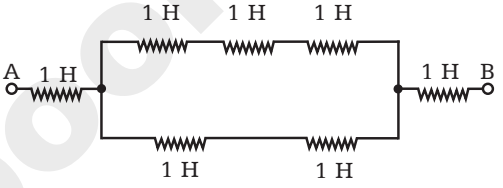
Ans: (A)

106. What is the equivalent capacitance (in μF) between the terminals A and B in the circuit given below?



A) 4.56 **B)** 5.67
C) 18.58 **D)** 51 **Ans: (B)**

107. What is the equivalent inductance (in H) between the terminals A and B itn the circuit given below?



A) 1 **B)** 1.42
C) 3.2 **D)** 7 **Ans: (C)**

108. Which of the following quantity will remain the same, when a layer of Teflon is inserted between the plates of a charged parallel plate capacitor?

A) Capacitance
B) Charge
C) Energy of the capacitor
D) Potential **Ans: (B)**

109. What will be the value of resistance (in kilo-ohms) of a carbon composition resistor having color-coding of brown-black-brown-black?

A) 400 **B)** 200
C) 300 **D)** 100 **Ans: (D)**

110. Which of the following is NOT a type of capacitor?

A) Ceramic **B)** Electrolytic
C) Film **D)** Wire wound

Ans: (D)

111. Which of the following is TRUE in case of Substitution theorem?

A) The initial condition of the rest of the circuit changes, if a network element is replaced by a voltage source having an equal voltage as the voltage across the element at every instant of time.

B) The initial condition of the rest of the circuit changes, if a network element is replaced by a voltage source having an equal current as the voltage across the element at every instant of time.

C) The initial condition of the rest of the circuit remains same, if a network element is replaced by a voltage source having an equal voltage as the voltage across the element at every instant of time.

D) The initial condition of the rest of the circuit changes, if a network element is replaced by a voltage source having an equal voltage as the current across the element at every instant of time.

Ans: (C)

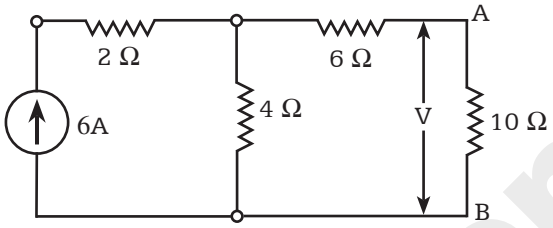
112. Which of the following theorem states that the sum of instantaneous power in 'n' number of branches of an electrical network is zero?

A) Compensation
B) Maximum power transfer
C) Superposition
D) Tellegen's **Ans: (D)**

113. Kirchhoff's voltage law is based on which of the following principle?

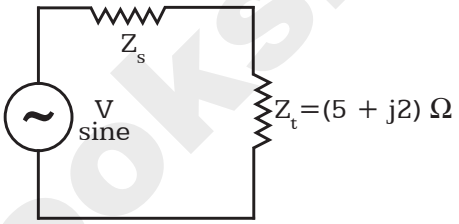
A) Conservation of charge
B) Conservation of energy
C) Conservation of force
D) Conservation of momentum **Ans: (B)**

114. What is the value of an unknown voltage 'V' (in V) across the terminal A and B, in the circuit given below?



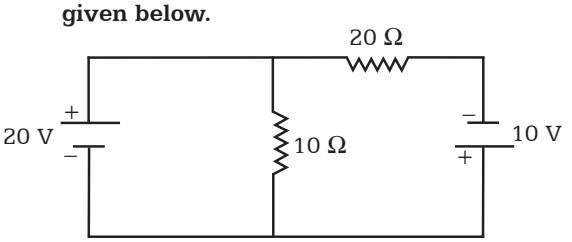
A) 6 **B)** 10
C) 12 **D)** 16 **Ans: (C)**

115. What will be the value of source impedance (in Ohms) for transmitting maximum power to the load in the circuit given below?



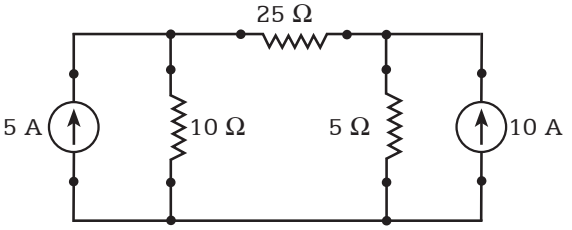
A) 5 + j 2 **B)** 5 – j 2
C) 2 + j 5 **D)** 2 – j 5 **Ans: (B)**

116. Determine the value of power dissipated (in W) through the 20 Ω resistor of the circuit given below.



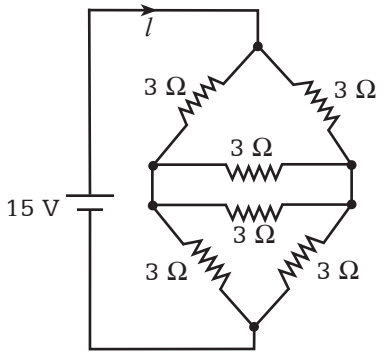
A) 30 **B)** 45
C) 60 **D)** 75 **Ans: (B)**

117. Determine the power dissipated (in W) by the Ω resistor in the circuit given below.



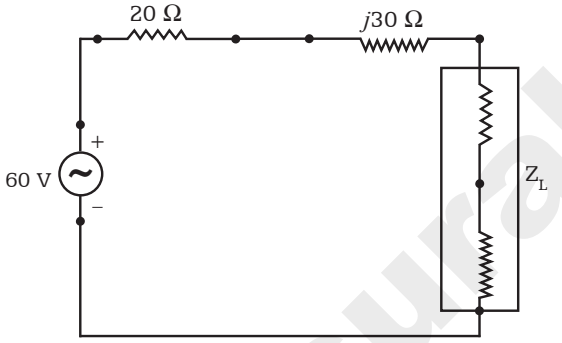
A) 0 **B)** 25
C) 125 **D)** 156.25 **Ans: (A)**

118. Determine the total current 'I' (in A) supplied by the voltage source in the circuit given below.



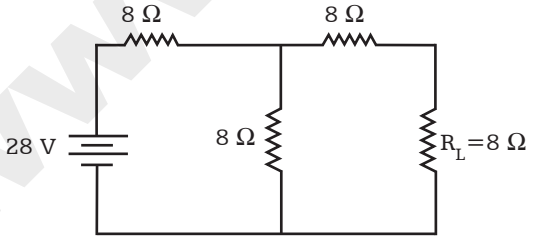
A) 3 **B)** 4
C) 5 **D)** 6 **Ans: (C)**

119. Determine the maximum power (in W) transferred from the source to the load of the circuit given below.



A) 18 **B)** 30
C) 45 **D)** 90 **Ans: (C)**

120. Determine the Norton's current (in A) and Norton's resistance (in Ω) respectively, for the given electrical circuit.



A) 1.167, 12 **B)** 2.345, 14
C) 4.434, 16 **D)** 2.346, 10 **Ans: (A)**

121. The S.I. unit of electric charge is _____.
A) Henry **B)** Coulomb
C) Tesla **D)** Weber **Ans: (B)**

122. Which of the following is a diamagnetic material?
A) Aluminium **B)** Oxygen
C) Lead **D)** Nickel **Ans: (C)**

123. Which of the following material shows paramagnetism?
A) Copper **B)** Iron
C) Titanium **D)** Silver **Ans: (C)**

124. Which of the following is the CORRECT expression for Gauss' Law?
A) $\phi_E = \frac{q}{\varepsilon_0}$ **B)** $\phi_E = \frac{\varepsilon_0}{q}$
C) $\phi_E = \frac{4E}{H}$ **D)** $\phi_E = \frac{4H}{E}$ **Ans: (A)**

125. Determine the intensity of magnetization (in A/m) of a magnet, when its pole strength is 100 Wb and has a pole area of 70 sq. m.
A) 4.98 **B)** 3.65
C) 2.53 **D)** 1.43 **Ans: (D)**

126. Hysteresis loss occurring in a material does NOT depend on which of the following parameters?
A) Hysteresis constant
B) Magnetic flux density
C) Frequency
D) Reluctivity **Ans: (D)**

127. Determine the eddy current loss (in W) in a material having eddy current coefficient of 1, thickness of 0.02 m and a volume of 1 cubic metre, which is kept in a magnetic field of maximum flux density of 2 T and supplied by a frequency of 50 Hz.
A) 2 **B)** 3
C) 4 **D)** 5 **Ans: (C)**

128. What will be the self-inductance (in mH) of a 4 m long air-core solenoid, if the diameter of the solenoid is 50 cm and has 300 turns?
A) 5.54 **B)** 6.94
C) 7.85 **D)** 8.64 **Ans: (A)**

129. What is the coupling factor between the two coils, each having self inductance of 25 mH and the mutual inductance between the two is 25 mH?

A) 0.5 **B)** 0.75
C) 1 **D)** 2 **Ans: (C)**

130. Determine the magnitude of the EMF (in V) induced between the axis of rotation and the rim of the disc, when the disc of radius 10 cm rotates with an angular velocity of 10 revolutions per second, which is placed in a magnetic field of 4 T acting parallel to the rotation of the disc.

A) 0.5 **B)** 0.75
C) 1 **D)** 1.25 **Ans: (D)**

131. Determine the peak value (in A) of the current used by a motor rated at 220 V, 30 A.

A) 21.2 **B)** 30
C) 42.4 **D)** 51.9 **Ans: (C)**

132. What will be the frequency (in Hz) of a sinusoidal wave, when the time period is 20 ms?

A) 50 **B)** 60
C) 40 **D)** 30 **Ans: (A)**

133. Determine the instantaneous value of the alternating current (in A), which is represented by $i(t) = 10 \sin(25t - 15)$ A, if the value of t is 3?

A) 9.36 **B)** 7.87
C) 8.66 **D)** 4.42 **Ans: (C)**

134. At resonant frequency, the impedance of a series resonant circuit is _____.

A) Zero **B)** maximum
C) infinite **D)** minimum
Ans: (D)

135. Determine the value of the phase angle (in degrees) in a series RC circuit having a resistance of 20 ohms and capacitive reactance of 11.56 ohms when supplied by a frequency of 50 Hz.

A) 60 **B)** 30
C) 90 **D)** 45 **Ans: (B)**

136. A 3-phase delta connected system is supplied by a line voltage of 200 V. The value of phase current is 30 A. What is the total power consumed (in W) by the system, if the current lags the voltage by 30 degrees?

A) 16.32 **B)** 14.45
C) 15.59 **D)** 16.69 **Ans: (C)**

137. What will be the capacitive susceptance (in Siements) of the circuit given below?

A) 0.126 **B)** 1.26
C) 12.6 **D)** 126.1 **Ans: (A)**

138. Determine the reactive power (in kVAR) of a 3-phase delta connected system having a line voltage of 400 V, line current of 40 A and the phase difference between the voltage and current is 45 degrees.

A) 14.4 **B)** 15.8
C) 18.7 **D)** 19.6 **Ans: (D)**

139. Determine the quality factor of a series RLC circuit, when the value of capacitance is 0.02 mF, the value of inductance is 8 mH and the value of resistance is 40 ohms.

A) 0.5 **B)** 0.4
C) 0.8 **D)** 1.3 **Ans: (A)**

140. What will be the time (in seconds) taken by the inductor reach its maximum steady state value in a series RL circuit, when the value of the inductance is 0.8 H and the value of the resistance is 10 Ohms?

A) 0.2 **B)** 0.6
C) 0.4 **D)** 0.8 **Ans: (C)**

141. Which one of the following is the dimension of energy?

A) $\frac{ML^2}{T^3}$ **B)** $\frac{ML^2}{T^2}$

C) $\frac{T^2}{ML^2}$ **D)** $\frac{ML^2}{QT^2}$

Ans: (B)

142. Which one of the following statement is NOT TRUE about the MI type instruments?

A) MI type Instruments are suitable for both AC and DC circuits.

B) Frictional error in MI type instruments is very less.

C) The torque weight ratio of MI type instruments is high.

D) The instrument cost is much higher as compared to PMMC type instruments.

Ans: (D)

143. Which one of the following statement is NOT TRUE about multimeter?

A) Multimeter can be used for the measurement of voltage.

B) Multimeter can be used for the measurement of power.

C) Multimeter can be used for the measurement of resistance.

D) Multimeter can be used for the measurement of current.

Ans: (B)

144. Which one of the following is the main cause of magnetic decay in PMMC type instrument?

A) Variation in the resistance of the moving coil

B) Quality of spring

C) Aging of the spring

D) Aging of the magnets **Ans: (D)**

145. Determine the quality factor in Hay's bridge given below. If the bridge is supplied by a frequency of 50 Hz.

A) 2 **B)** 1

C) 0 **D)** 4 **Ans: (A)**

146. Determine the apparent power (in W) of a circuit, if the circuit have a power factor of 0.8 and the reactive power of the circuit is 60 W.

A) 80 **B)** 75

C) 60 **D)** 55 **Ans: (B)**

147. A building has 3 floors and each floor has 4 fans of 50 W that operates for 12 hours a day and one air conditioner of 3000 W that operates for 2 hours per day in the month of the June. Determine the energy consumption (in kWh) of the building in June.

A) 512 **B)** 252

C) 756 **D)** 504 **Ans: (C)**

148. Determine the reading (in kW) of both the wattmeters used to measure the power of a three-phase three-wire system having input of 6 kW and power factor of 1.

A) 4, 2 **B)** 5, 1

C) 3, 3 **D)** 6, 0 **Ans: (C)**

149. What will be the secondary voltage (in V) of a potential transformer, if the value of system voltage is 11,000 V, the turn's ratio of the potential transformer is 108 and the percentage voltage error of the transformer is 5%?

A) 86.8 **B)** 93.6

C) 84.6 **D)** 96.8 **Ans: (D)**

150. Determine the full-scale reading (in V) of a PMMC type voltmeter, when the internal resistance of the voltmeter is 230 kilo-ohms, the series resistance connected with the voltmeter is 70 kilo-ohms and the sensitivity of the voltmeter is 3 kilo-ohms/volt.

A) 200 **B)** 150

C) 100 **D)** 250 **Ans: (C)**

151. The brush contact losses in a d.c. machine is

A) Inversely proportional to the square of current

B) Directly proportional to the square of current

C) Inversely proportional to the current

D) Directly proportional to the current

Ans: (D)

152. In which transformer, the tertiary winding is used?

A) Star - delta **B)** Star - star

C) Delta - delta **D)** Delta - star

Ans: (B)

153. Secondary winding of an auto transformer is also called_____.
A) compensating winding
B) common winding
C) tertiary winding
D) damping winding **Ans: (B)**

154. The maximum allowable voltage between adjacent segment is
A) 10 - 20V **B)** 20 - 30V
C) 40 - 50V **D)** 30 - 40V **Ans: (D)**

155. The field control of a DC shunt motor gives_____.
A) constant torque drive
B) constant kW drive
C) constant speed drive
D) variable load speed drive **Ans: (B)**

156. The no load current in a transformer is
A) Sinusoidal **B)** nonSinusoidal
C) Trapezoidal **D)** stepped **Ans: (B)**

157. Transformer cooling and insulation oil must be of
A) low viscosity **B)** high viscosity
C) low BDV **D)** low resistivity
Ans: (D)

158. Single Phase transformers can be used in parallel only when their voltages are
A) Equal **B)** Unequal
C) Zero **D)** None of these
Ans: (A)

159. When the phase sequence of supply currents are reversed, then the direction of rotation of the resultant magnetic field wave
A) not unchanged **B)** to and fro
C) reversed **D)** None of these
Ans: (C)

160. The availability of full-rated torque at starting is obtained from induction motor is
A) rotor resistance control
B) stator voltage control
C) slip ring control
D) line current control **Ans: (A)**

161. The starting torque of a 1-phase induction motor is
A) High **B)** Moderate
C) Low **D)** Zero **Ans: (D)**

162. In a shaded pole single-phase motor, the revolving field is produced by the use of
A) inductor **B)** capacitor
C) resistor **D)** shading coils
Ans: (D)

163. The repulsion-start induction-run motor is used because of_____.
A) good power factor
B) high efficiency
C) minimum cost
D) high starting torque **Ans: (D)**

164. The rotor slots, in an induction motor, are usually not quite parallel to the shaft because it
A) improves the efficiency
B) helps the rotor teeth to remain under the stator teeth
C) helps in reducing the tendency of the rotor teeth to remain under the stator teeth
D) improves the power factor **Ans: (C)**

165. A shaded pole motor can be used for
A) toys **B)** hair dryers
C) circulators **D)** any of the options
Ans: (D)

166. The rotor of a hysteresis motor is made of
A) aluminium **B)** cast iron
C) chrome steel **D)** copper **Ans: (C)**

167. The main advantage of AC transmission system over DC transmission system is
A) easy transformation
B) less losses in transmission over long distances
C) less insulation problems
D) less problem of instability **Ans: (B)**

168. Next lower voltage line feeding areas on either side of the main transmission line is called
A) secondary distribution
B) secondary transmission
C) primary transmission
D) primary distribution **Ans: (B)**

169. ACSR stands for

A) All Copper Standard Reinforced Conductor
B) Aluminium Conductor Steel Reinforced Conductor
C) Aluminium Copper Steel Reinforced Conductor
D) All Copper Steel Reinforced Conductor

Ans: (B)

170. The insulating material for cables should have

A) high dielectric strength
B) high mechanical strength
C) low cost
D) all options are correct **Ans: (D)**

171. The main source of hydro-electric power station is

A) coal **B)** generator
C) water **D)** nuclear **Ans: (C)**

172. The function of circuit breaker is

A) to safe guard the circuit
B) to On and Off the circuit
C) to safe human life
D) None of these **Ans: (A)**

173. Wiring clips are usually made of

A) copper **B)** steel
C) Brass **D)** aluminium

Ans: (B)

174. The switch unit need not be on the what type of wire?

A) Phase **B)** Neutral
C) Earth **D)** Any of the options

Ans: (B)

175. One unit of electrical energy equals

A) 1Kwh **B)** 1Wh
C) 10 Wh **D)** 100 Wh **Ans: (A)**

176. Filaments of electric bulbs are usually made of

A) Nichrome **B)** carbon
C) Copper **D)** Tungsten **Ans: (D)**

177. Insulation resistance is expressed by

A) ohm **B)** milli ohm
C) mega ohm **D)** micro ohm

Ans: (C)

178. In which of the following equipments, current rating is not necessary?

A) Circuit breaker **B)** Relay
C) Isolator **D)** Load break switch

Ans: (C)

179. Which type of fan used between dust collector and chimney in thermal power plant?

A) Forced draft **B)** Induced draft
C) Ceiling fan **D)** Table fan **Ans: (B)**

180. Who invented the electric bulb?

A) Tesla **B)** Marconi
C) Edison **D)** Benjamin **Ans: (C)**

181. Incandescent lamp is filled by

A) argon gas **B)** oxygen gas
C) carbon di oxide **D)** Sulphur oxide

Ans: (A)

182. In house wiring which type of insulation is used?

A) Rubber **B)** P.V.C.
C) V.I.R **D)** Paper **Ans: (A)**

183. The unit of solid angle is

A) Solid angle **B)** Radian
C) Steradian **D)** Candela **Ans: (C)**

184. In case of frosted GLS lamps, frosting of shell is done by _____.

A) acid etching **B)** ammonia
C) ozone **D)** salt water **Ans: (A)**

185. The resistance of arc

A) Decreases with increase of the current
B) Increases with increase of the current
C) Does not depend on current
D) None of these **Ans: (A)**

186. For welding duty the rectifier commonly used are

A) Mercury arc rectifier
B) Selenium metal rectifier
C) Both Mercury arc rectifier and Selenium metal rectifier
D) None of these **Ans: (B)**

187. The device necessarily used for automatic temperature control in a furnace is
A) Thermostat **B)** Auto-transformer
C) Thermo-couple **D)** Any of the options
Ans: (C)

188. The ideal method of heating plastics is
A) Coal/oil fired furnace
B) Dielectric heating
C) Induction heating
D) Resistance heating **Ans: (B)**

189. Which of the following element belongs to the same group of periodic tables as that of silicon and lead?
A) Phosphorous **B)** Carbon
C) Arsenic **D)** Mercury **Ans: (C)**

190. The merging of a free electron and a hole is known as
A) recombination **B)** extrusion
C) absorption **D)** adsorption **Ans: (A)**

191. The circuit that would be used for 455 kHz, if amplifier is
A) resistance loaded
B) double tuned transformer
C) video amplifier
D) class C **Ans: (B)**

192. A transistor is a combination of two p-n junction with their
A) p region connected together
B) n region connected together
C) n region connected to other p region
D) p region connected together and n region connected together **Ans: (D)**

193. What are the ON/OFF terminals of a transistor when it is operated as a switch?
A) Collector to base **B)** Collector of emitter
C) Base to collector **D)** Emitter to base
Ans: (B)

194. If negative feedback is used in the amplifier circuit, it _____.
A) increases distortion
B) increases gain
C) reduces distortion
D) no effect on distortion **Ans: (C)**

195. The power factor of a synchronous motor, When the field is under-excited
A) leading **B)** unity
C) lagging **D)** zero **Ans: (C)**

196. To limit the operating temperature of synchronous motor, it should have proper
A) current rating **B)** voltage rating
C) power factor **D)** speed **Ans: (A)**

197. A synchronous machine with large air gap has_____.
A) a higher value of stability limit
B) a higher synchronizing power
C) a small value of regulation
D) all options are correct **Ans: (D)**

198. synchronous motor speed
A) decreases as the load decreases
B) increases as the load increases
C) always remains constant
D) None of these **Ans: (C)**

199. The magnitude of field flux in a 3-phase synchronous machine
A) varies with speed
B) remains constant at all loads
C) varies with power factor
D) varies with the load **Ans: (B)**

200. In a synchronous motor, the magnitude of back e.m.f depends on_____.
A) speed of the motor
B) d.c. excitation only
C) load on the motor
D) both the speed and rotor flux **Ans: (B)**