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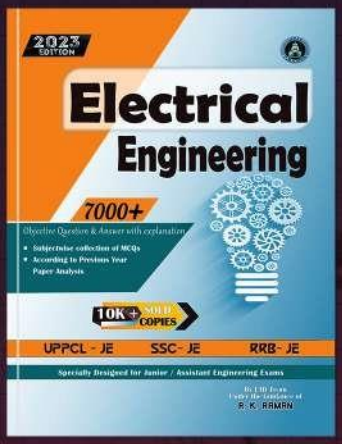

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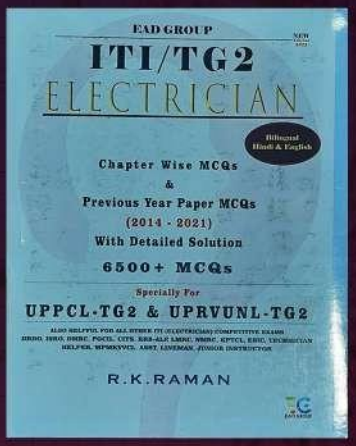

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UJVNL

ELECTRICAL ENGINEERING

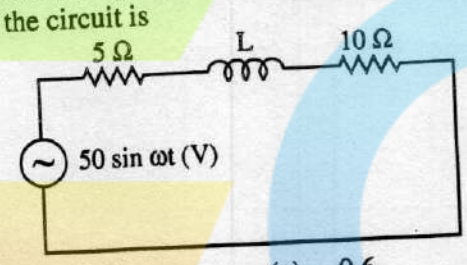
PAPER-II

1. A pure inductor has power factor of
(a) 1 (b) $1/\sqrt{2}$ (c) 0 (d) None of these

2. A series RLC circuit resonate at 200 Hz. If the capacitance is increased to four times, the circuit will be in resonance at
(a) 100 Hz (b) 200 Hz (c) 400 Hz (d) 800 Hz

3. The voltage phasor of a circuit is $10 \angle 15°$ V and the current phasor is $2\angle -45°$ A. The active and reactive powers in the circuit are
(a) $20\sqrt{2}$ W and $10\sqrt{2}$ VAR (b) 10 W and $10\sqrt{3}$ VAR
(c) 5 W and $5\sqrt{3}$ VAR (d) $10\sqrt{3}$ W and – 10 VAR

4. In the circuit shown in the figure, if the power consumed by the 5 Ω resistor is 10 W, then the power factor of the circuit is

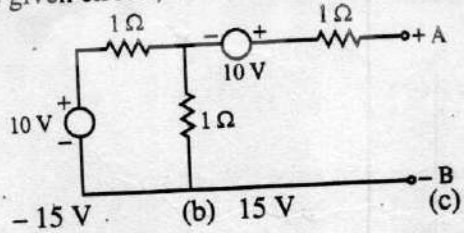


(a) 0.8 (b) 0.5 (c) 0.6 (d) 0

5. Resistance between terminals A and B of the given figure is

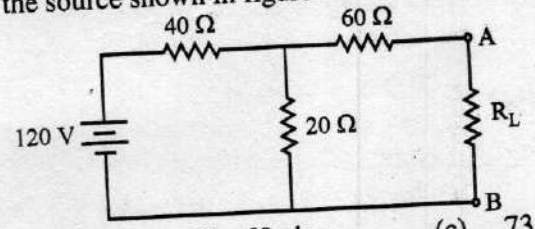
(a) 3/5 R (b) 1/5 R (c) R (d) 2/5 R

6. In the given circuit, Thevenin voltage across the terminal AB is



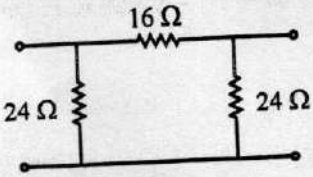
(a) – 15 V (b) 15 V (c) 5 V (d) 0 V

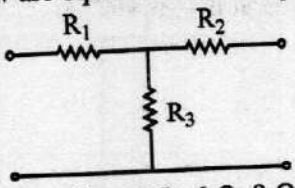
7. Calculate the value of load resistance R_L to which maximum power may be transferred from the source shown in figure



(a) 33.73 ohm (b) 60 ohm (c) 73.33 ohm (d) 100 ohm

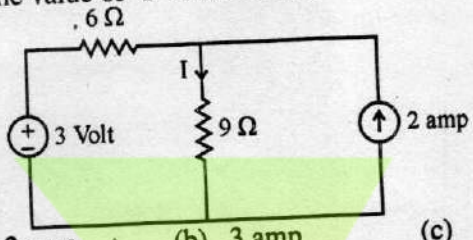
8. If the π and T circuits in figure below are equivalent, then R_1, R_2, R_3 respectively are





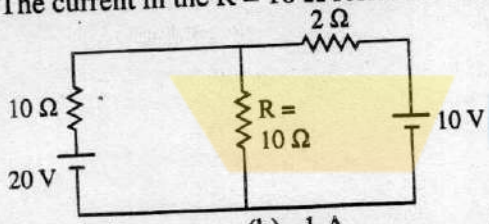
(a) 9 Ω, 6 Ω, 6 Ω
(b) 6 Ω, 6 Ω, 9 Ω
(c) 9 Ω, 6 Ω, 9 Ω
(d) 6 Ω, 9 Ω, 6 Ω

9. Find the value of 'I' in the circuit.



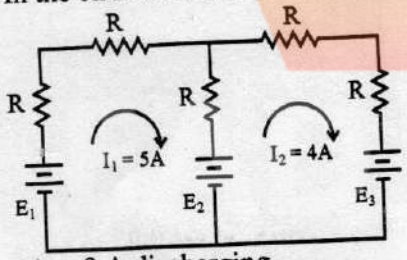
(a) 2 amp (b) 3 amp (c) 4 amp (d) 1 amp

10. The current in the R = 10 Ω resistance in the circuit below is



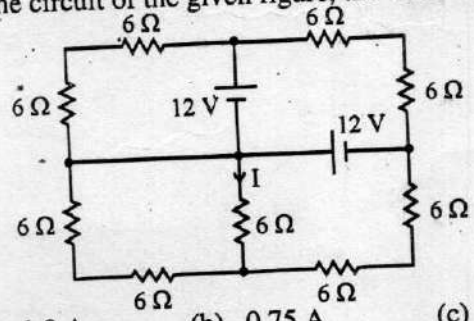
(a) 0 A (b) 1 A (c) 2 A (d) 3 A

11. In the circuit below, the current through E_2 is



(a) 9 A discharging
(b) 9 A charging
(c) 1 A discharging
(d) 1 A charging

12. For the circuit of the given figure, the value of current I is

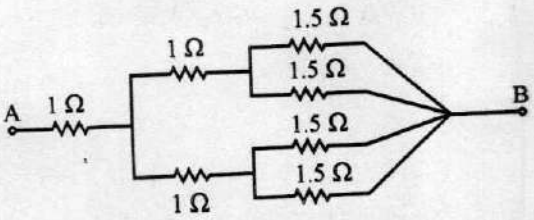


(a) 1.0 A (b) 0.75 A (c) 0.5 A (d) 0.25 A

13. The electrical energy consumed by an appliance of power rating P watts connected across its rated V for t hours is

(a) P/V .t kWhr (b) $\frac{Pt}{1000}$ kWhr (c) Pt kWhr (d) $\frac{Pt}{3600}$ kWhr

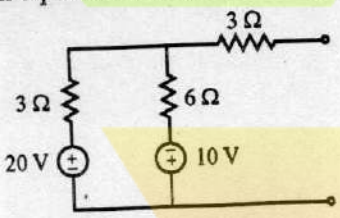
14.



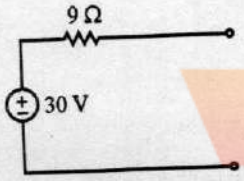
Equivalent resistance between A & B, in the figure above is

(a) 1.875 Ω (b) 2.875 Ω (c) 0.53 Ω (d) 2.125 Ω

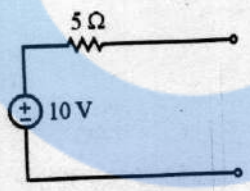
15. Norton equivalent of the circuit given below is



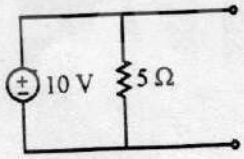
(a)



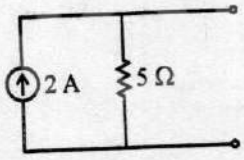
(b)



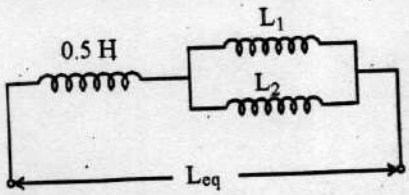
(c)



(d)

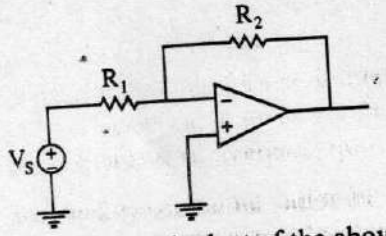


16. In the given circuit, inductances L_1 and L_2, if $L_1 = 2L_2$ and L_{eq} is 0.7 H, are

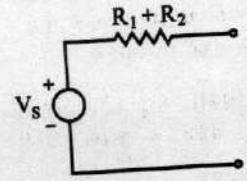


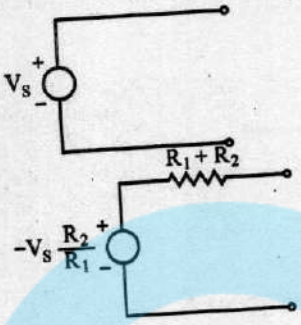
(a) 0.4 H and 0.8 H respectively (b) 0.6 H and 0.3 H respectively

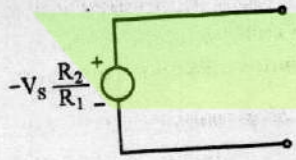
(c) 0.8 H and 0.4 H respectively (d) 1.0 H and 0.5 H respectively

17. 

Thevenin equivalent of the above circuit w ll be

(a) 

(b) 

(c) 

(d)

18. In a six pole motor, 4 mechanic l degrees is equal to
(a) 4 electrical degrees (b) 2 electrical degrees
(c) 8 electrical degrees (d) 12 electrical degrees

19. An ideal synchronous motor has no starting torque because the
(a) Rotor is made up of salient poles.
(b) Relative velocity betwee the stator and rotor mmfs is zero.
(c) Relative velocity betwee stator and rotor mmfs is not zero.
(d) Rotor winding is highly inductive.

20. At a slip of 4%, maximum possible speed of a 3-phase squirrel cage induction motor is
(a) 2880 rpm (b) 3000 rp (c) 1500 rpm (d) 1440 rpm

21. If the stator winding of a three-ph se induction motor is delta connected, the rotor winding
(a) should be delta connected (b) should be star connected
(c) should not be delta connect l (d) may be delta or star connected

22. Synchronous motors are to be used in situations where
(a) The load is constant.
(b) The load is required to be d i ven at very high speeds.
(c) The load is to be driven at c astant speed.
(d) The starting torque requirem nt of the load is very high.

23. When excitation of synchronous motor is increased upto normal excitation from under excitation, armature current
(a) increases (b) decreases
(c) remains constant (d) None of the above

24. In a synchronous motor, damper winding is provided to
(a) stabilize rotor motion (b) suppress rotor oscillations
(c) develop necessary starting torque (d) (b) and (c) both

25. Direction of rotation of three phase induction motor can be reversed by
(a) interchanging connections of any two phases
(b) disconnecting any one phase
(c) (a) and (b) both
(d) None of the above

26. Variation in dc excitation of a synchronous motor causes variation in
(a) Speed of motor
(b) Power factor
(c) Armature current
(d) Both armature current and power factor

27. Reduction in supply voltage by 10% will change the torque of an induction motor by
(a) 38% (b) 19% (c) 9.5% (d) No change

28. The step angle of the stepper motor is 2.5°. If the stepping frequency is 3600 pulses per second, then the shaft speed will be
(a) 144 rps (b) 3600 rps (c) 25 rps (d) 2.5 rps

29. A 3-phase, 50 Hz, 500 V induction motor develops 20 hp at slip of 5%. Mechanical losses are 1 hp, and stator loss is 1 kW. The efficiency will be
(a) 95.3% (b) 90.5% (c) 91.3% (d) 85.3%

30. The electric motor used in toys is
(a) capacitor start motor (b) split phase motor
(c) shaded pole motor (d) None of these

31. AC servo-motor is basically a
(a) Capacitor motor (b) Two phase motor
(c) Three phase motor (d) Universal motor

32. Crawling in an induction motor is due to
(a) Space harmonics produced by winding currents.
(b) Time harmonics in supply.
(c) Slip ring rotor.
(d) Insufficient starting torque.

33. A shaded pole induction motor does not have the advantage of
(a) Rugged construction
(b) Low initial as well as maintenance cost
(c) High starting torque
(d) Comparatively small starting current

34. In three phase 400 volt, 50 Hz supply, the phase to neutral voltage is
(a) 220 Volt (b) 230 Volt (c) 440 Volt (d) 150 Volt

35. Integration of unit ramp function gives
(a) Unlt parabolic function (b) Unit ramp function
(c) Unit doublet function (d) None of these

36. In house wiring, Black & Green wires indicate
(a) Earth & Neutral respectively (b) Phase & Neutral respectively
(c) Phase & Earth respectively (d) Neutral & Earth respectively

37. Ferranti effect on long overhead lines is experienced when
(a) the line is highly loaded. (b) the power factor is unity.
(c) the power factor is leading. (d) corona effect is dominated.

38. A 10 kVA, 400 V/200 V, single-phase transformer with 10% impedance, draws a steady short circuit current of
(a) 50 A (b) 150 A (c) 250 A (d) 350 A

39. Kick fuses are used across relay coils to prevent relay operation during
(a) Heavy external faults
(b) Inrush current of transformer when they are energised
(c) Line to ground faults
(d) Bolted faults

40. For a fuse wire of diameter 'd', fusing current is proportional to
(a) $\sqrt{d}$ (b) $d^{1.2}$ (c) $d^{1.5}$ (d) None of these

41. Differential relays are used for the protection of equipments against
(a) Internal faults (b) Over current
(c) Reverse current (d) Reverse power

42. A 3-phase circuit breaker is rated at 1250 A, 2000 MVA, 33 kV, 4s. Its making current capacity will be
(a) 35 kA (b) 89 kA (c) 79 kA (d) 69 kA

43. Main function of the fuse is to
(a) Protect the line (b) Open the circuit
(c) Protect the appliance (d) Prevent excessive current

44. Distribution voltage levels in India are
(a) 11 kV, 400 V, 3 ϕ (b) 33 kV, 11 kV, 3 ϕ
(c) 220 kV, 11 kV, 3 ϕ (d) None of the above

45. By burden on the relay, we generally mean
(a) Current rating of relay (b) Voltage rating of relay
(c) Volt-ampere rating of relay (d) Watt rating of relay

46. In a static over-current relay, inverse time characteristics are obtained by
(a) A differentiating circuit (b) An integrating circuit
(c) A transistor amplifier (d) A transistor switch

47. At atmospheric pressure, the dielectric strength of SF_6 is about
(a) 2.5 times of air (b) 2.5 times of oil
(c) 2.5 times of vacuum (d) None of the above

48. Mho relay is
(a) current restrained current relay. (b) voltage restrained directional relay.
(c) current restrained directional relay. (d) voltage restrained current relay.

49. Main purpose of oil in OCB is to
(a) provide insulation (b) provide cooling of contacts
(c) quenching arc (d) None of the above

50. Which of the following circuit breaker is generally used in railway electrification ?
(a) Air Blast circuit breaker (b) Minimum Oil circuit breaker
(c) Bulk Oil circuit breaker (d) SF_6 circuit breaker

51. Isolators are used for disconnecting a circuit when
(a) Line is energised (b) Line is on full load
(c) Line carries no current (d) Can be operated under any condition

52. The transmission line feeding power on either side of the main transmission line is called
(a) Secondary distribution (b) Secondary transmission
(c) Primary transmission (d) Primary distribution

53. What is the approximate value of average resistance of a human body ?
(a) 1 kΩ (b) 5 kΩ (c) 10 kΩ (d) 15 kΩ

54. The skin effect of the conductor increases the effective value of
(a) Inductance of the conductor (b) Resistance of the conductor
(c) Capacitance of the conductor (d) None of these

55. Which portion of the transmission system is more prone to faults ?
(a) Alternator (b) Transformer
(c) Overhead lines (d) Underground cables

56. The insulation strength of EHV lines is mainly governed by
(a) Switching overvoltages (b) Lightning overvoltages
(c) Power frequency overvoltages (d) Dynamic overvoltages

57. Pilot relaying schemes are used for the protection of
(a) Bus bars (b) Transformer
(c) Instrument transformer (d) Transmission line

58. The restriking voltage is measured in
(a) RMS value (b) Peak value
(c) Instantaneous value (d) Average value

59. In an n-bus power system, considering n-nodes network, the size of y_{bus} is
(a) $(n-1) \times (n-1)$ (b) $(n+1) \times (n+1)$
(c) $n \times n$ (d) $2n \times 2n$

60. Which fault gives rise to symmetrical fault currents ?
(a) Single line to ground fault (b) Line to line fault
(c) Double line to ground fault (d) Three phase fault

61. Typical solar cell efficiency is
(a) Less than 5% (b) 12% to 25% (c) 30% to 40% (d) More than 50%

62. India receives solar energy in the range of
(a) 5-7 kWh/m^2 for 300-330 days in a year
(b) 50-70 kWh/m^2 for 300-330 days in a year
(c) 5-7 kWh/m^2 for 200-230 days in a year
(d) 50-70 kWh/m^2 for 200-230 days in a year

63. Biogas comprises mainly of
(a) 60% oxygen and 40% carbon dioxide
(b) 60% oxygen and 40% methane
(c) 60% methane and 40% oxygen
(d) 60% methane and rest carbon dioxide

64. Global warming is mainly due to
(a) Emission of heat from engines
(b) Emission of CO_2 due to burning of fossil fuels
(c) Use of nuclear energy
(d) Air pollution

65. The possible site for Geothermal energy extraction for the purpose of electricity in India is
(a) Madhya Pradesh (b) Kerala
(c) Tamil Nadu (d) Assam

66. Horizontal axis and vertical axis are the types of
(a) Nuclear Reactor (b) Wind Mills
(c) Bio Gas Reactor (d) Solar Cell

67. The Fill Factor of a silicon solar cell is approximately
(a) 1 (b) 0.7 (c) 0.5 (d) 0

68. Major share of power generated in India is through
(a) Thermal Power Plants (b) Nuclear Power Plants
(c) Hydro-electric Power Plants (d) Solar energy

69. Match Lists L-I and L-II below, in respect of India's installed capacity of non-conventional energy, as on date.

	L – I		L – II
1.	Solar Power	A.	2800 MW
2.	Wind Power	B.	3063 MW
3.	Bagass Cogeneration	C.	1365 MW
4.	Biomass Power	D.	22,465 MW

	1	2	3	4
(a)	A	B	C	D
(b)	B	A	C	D
(c)	D	B	A	C
(d)	B	D	A	C

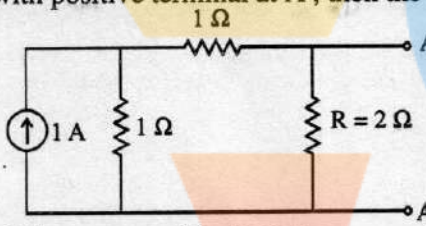
70. When a body reflects all the radiations incident on it, then the body is known as
(a) White body (b) Grey body
(c) Black body (d) Transparent body

71. A diesel power station spends 0.25 kg/kWh fuel. If the calorific value is 10,000 kcal/kg then overall efficiency of the power station will be
(a) 25% (b) 30% (c) 34.4% (d) 100%

72. Admittance is the reciprocal of
(a) Impedance (b) Reactance (c) Susceptance (d) Inductance

73. An inductor at $t = 0^+$ with zero initial conditions acts as
(a) short circuit (b) open circuit (c) current source (d) voltage source

74. In the circuit shown, if we connect a source of 2 volt with internal resistance of 1 Ω at AA′ with positive terminal at A′, then the current through R is



(a) 2 A (b) 1.66 A (c) 1 A (d) 0.625 A

75. Which of the following statements pertains to resistors only ?
(a) They oppose sudden change in voltage.
(b) They can act as energy storage device.
(c) They can dissipate desired amount of power.
(d) None of the above.

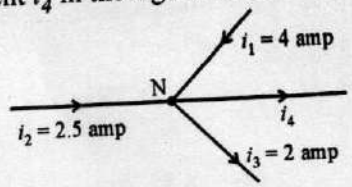
76. What is the maximum number of points of light, fan and socket-outlets that can be connected in one sub-circuit ?
(a) 5 (b) 10 (c) 20 (d) 30

77. Minimum distance of underground cable from the foundation of building should be
(a) 100 cm (b) 50 cm (c) 10 cm (d) 5 cm

78. Official systemetic, scientific study of energy consumption by the related organisation for cost reduction and energy conservation is
(a) energy policy (b) energy audit
(c) (a) and (b) both (d) None of the above

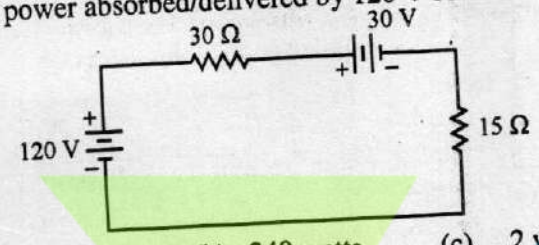
79. The type of wiring that is highly suitable for a temporary shed is
(a) Cleat wiring (b) Wooden capping and casing wiring
(c) Lead sheathed wiring (d) Conduit wiring

80. Current i_4 in the figure will be



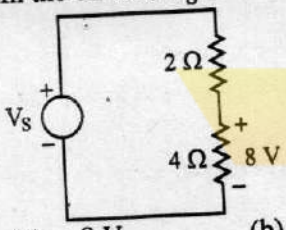
(a) 13 amp (b) 0.5 amp (c) 4.5 amp (d) 8.5 amp

81. Find power absorbed/delivered by 120 V source.



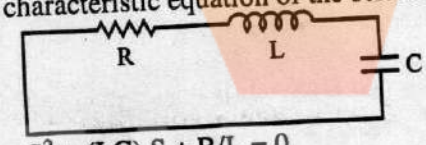
(a) 120 watts (b) 240 watts (c) 2 watts (d) 1 watt

82. In the circuit, V_S is



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

83. The characteristic equation of the series RLC circuit is



(a) $S^2 + (LC)\,S + R/L = 0$ (b) $S^2 + (1/LC)\,S + L/R = 0$
(c) $S^2 + (L/R)\,S + LC = 0$ (d) $S^2 + (R/L)\,S + 1/LC = 0$

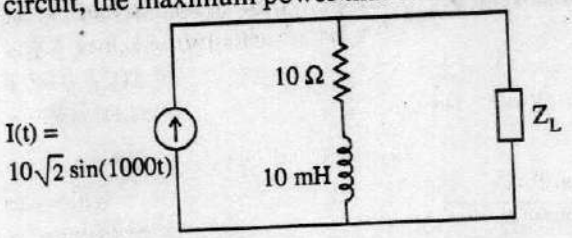
84. A network has 10 nodes and 17 branches. The number of independent mesh equations required to solve the network is
(a) 7 (b) 8 (c) 10 (d) 45

85. Which of the following elements is not bilateral ?
(a) Resistor (b) Inductor (c) Capacitor (d) Transistor

86. Each branch of Y-connected load has resistance of 10 Ω. The resistance of each branch of an equivalent Δ-connected load will be
(a) 30 Ω (b) 100 Ω (c) 110 Ω (d) None of these

87. In applying superposition theorem, to determine branch currents and voltages
(a) all current and voltage sources are shorted.
(b) only current sources are open circuited.
(c) only voltage sources are shorted.
(d) voltage sources are shorted and current sources are open circuited.

88. In the circuit, the maximum power that can be transferred to Load Z_L is



(a) 250 W (b) 500 W (c) 1000 W (d) 2000 W

89. The material used for fuse wire should be of
(a) low resistivity and high melting point
(b) high resistivity and high melting point
(c) high resistivity and low melting point
(d) low resistivity and low melting point

90. It is desired to illuminate a drawing hall with an average illumination of about 250 lux. The area of hall is 30 m × 20 m. The lamps are to be fitted at 5 m height. Find the number and size of incandescent lamps required for an efficiency of 12 lumen/watt. Utilization factor = 0.4 and maintenance factor = 0.85.
(a) 40 and 1000 W (b) 20 and 500 W
(c) 60 and 1000 W (d) None of the above

91. Battery operated scooter for braking uses
(a) plugging (b) mechanical braking
(c) regenerative braking (d) rheostatic braking

92. In spot welding, electric supply used is
(a) low voltage high current (b) high voltage low current
(c) low voltage low current (d) high voltage high current

93. In the process of refining of metals, the impure metal is made as
(a) Cathode (b) Anode
(c) Electrolyte (d) None of the above

94. Minimum clearance above ground of the lowest conductor of an overhead line erected along a street for low and medium voltages as per "Indian Electricity Rules" is
(a) 4.5 metres (b) 6.1 metres (c) 6.5 metres (d) 5.5 metres

95. Synchronous capacitor is
(a) An ordinary static capacitor bank.
(b) An over excited synchronous motor driving mechanical load.
(c) An over excited motor running without mechanical load.
(d) None of the above

96. In terms of cost, overhead transmission line is better than underground transmission line in the field of
(a) Insulation (b) Right of way (c) Visibility (d) None of these

97. Materials used in plate earthing are
(a) Wood coal (b) Salt, earthing plate
(c) (a) and (b) both (d) None of the above

98. The rating of fuse wire is always expressed in
(a) volts (b) amperes (c) ampere-volt (d) ampere-hours

99. An automatic power factor controller cannot achieve :
(a) Voltage control (b) kVAR control
(c) kW control (d) pf control

100. A single phase energy meter has a constant of 1200 revolution/kWh. When a load of 200 W is connected, the disc rotates at 4.2 revolutions per min. If the load is on for 10 hours, the meter records an excess of
(a) 0.1 kWh (b) 0.2 kWh (c) 1.0 kWh (d) 2.0 kWh

101. Aluminium conductor cables can be joined by
(a) Gas welding (b) Soldering
(c) Compression (d) Thermit welding

102. From the point of view of safety, the resistance of earthing electrode should be
(a) Low
(b) High
(c) Medium
(d) The value of resistance of earth does not affect the safety

103. The insulating fluids that are commonly used in circuit breakers is/are
(a) SF_6 (b) Air at atmospheric pressure
(c) Compressed air (d) All of the above

104. Which of the following test is carried out to ensure the sufficient strength of insulation between two or more conductors to avoid leakage between them ?
(a) Testing of insulation resistance between wiring and earth
(b) Testing of insulation resistance between conductors
(c) Testing of polarity of single phase switch
(d) Testing of earth continuity path

105. An isolated sphere has a capacitance of 50 pf. If its potential is raised to 10^4 volts, radius and charge will be respectively. Given that $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9$ m.
(a) 54 cm, 0.5 μC (b) 4.5 cm, 5.0 μC
(c) 45 cm, 0.5 μC (d) 5.4 cm, 5.0 μC

106. Which distribution system is more reliable ?
(a) Ring main system (b) Tree system
(c) Radial system (d) All are equally reliable.

107. HV transmission lines use
(a) Pin type insulators (b) Suspension insulators
(c) Both (a) and (b) (d) None of the above

108. For proper earthing, what should be the maximum value of earth resistance while carrying out the testing of earth continuity path ?
(a) 1 Ω (b) 2 Ω (c) 5 Ω (d) 10 Ω

109. The advantage of using pulverized fuel include
(a) Higher boiler efficiency (b) Easy and complete combustion
(c) Low air requirement (d) All of the above

110. 1 Ton (unit of air conditioning load) in terms of kW is
(a) 3.5 kW (b) 4.7 kW (c) 12 kW (d) 10.5 kW

111. In steam locomotive, electric power is provided through
(a) Battery system (b) Diesel engine generator
(c) Overhead wire (d) Small turbo generator

112. Which of the following methods of heating is not dependent on the frequency of supply ?
(a) Induction heating (b) Dielectric heating
(c) Electric Resistance heating (d) All of the above

113. A single-phase AC arc welding transformer supplies approximately
(a) 100 volts at 0.35 power factor (b) 60 volts at 0.35 power factor
(c) 220 volts at 0.8 power factor (d) 100 volts at 0.6 power factor

114. Long distance railways use for their electric traction
(a) 200 V dc (b) 25 kV single phase ac
(c) 25 kV two phase ac (d) 25 kV three phase ac

115. Which type of motor is used for elevators ?
(a) Synchronous motor (b) Inductor motor
(c) Split phase motor (d) All of the above

116. Minimum wind speed required for generating electricity in a wind mill is
(a) 15 m/hour (b) 1 km/hour
(c) 15 km/hour (d) None of the above

117. The rotor of a stepper motor has no
(a) Winding (b) Commutator
(c) Brushes (d) All of the above

118. The colour having shortest wavelength in the following is
(a) Yellow (b) Blue (c) Orange (d) Green

119. A synchronous motor is essentially a motor with
(a) Constant speed (b) Leading power factor
(c) Unity power factor (d) Lagging power factor

120. At low values of slip, the torque of an induction motor is
(a) directly proportional to the square of the slip.
(b) inversely proportional to the square of the slip.
(c) directly proportional to the slip.
(d) inversely proportional to the slip.

121. An infinite bus-bar has
(a) constant voltage (b) constant frequency
(c) infinite voltage (d) both (a) and (b)

122. If the supply frequency of a 3-phase induction motor is 'f', then frequency of rotor emf at motor slip 's' will be
(a) sf (b) $(1 - s)f$ (c) f/s (d) None of these

123. If a four pole synchronous generator driven at 1500 rpm feeds a 6-pole induction motor, which is loaded to run at a slip of 5%, then speed of the motor will be
(a) 1000 rpm (b) 950 rpm (c) 1500 rpm (d) 1450 rpm

124. Which of the following vapour/gas will give yellow colour ?
(a) Helium (b) Mercury (c) Sodium (d) Magnesium

125. If the distance between the light source and the surface is reduced to half, the illumination on the surface will
(a) reduce to half of the original. (b) reduce to one fourth of the original.
(c) increase to double of the original. (d) increase to four times of the original.

126. 80% Ni, 20% Cr is called as
(a) Constantan (b) Nichrome (c) Kanthal (d) None of these

127. Electric arc welding process produces temperature upto
(a) 1000 °C (b) 1500 °C (c) 3500 °C (d) 5550 °C

128. During the resistance welding heat produced at the joint is proportional to
(a) I^2R (b) kVA (c) Current (d) Voltage

129. Which of the following motors is used in household refrigerators ?
(a) AC series motor (b) DC shunt motor
(c) Reluctance motor (d) Single phase induction motor

130. The PLC was invented by
(a) Bill Gates (b) Dick Morley (c) Bill Landis (d) Tod Cunningham

131. Match the Lists L-I and L-II.

L – I	L – II
1. Bolometer	A. Flow
2. H-Bridge	B. Displacement
3. LVDT	C. Radiation
4. Anemometer	D. DC Motor

	1	2	3	4
(a)	C	D	B	A
(b)	D	C	A	B
(c)	A	C	B	D
(d)	D	C	B	A

132. Which meter is suitable for the measurement of 10 mV at 50 MHz ?
(a) Moving iron voltmeter (b) CRO
(c) Electrostatic voltmeter (d) VTVM

133. Programmable Logical controllers are the devices that were invented basically to replace
(a) Switches (b) Circuit Breakers
(c) Relays (d) None of the above

134. Load cell essentially is a
(a) Thermistor (b) Strain gauge
(c) Photo-voltaic cell (d) None of these

135. Stranded wires are mainly used to
(a) reduce skin effect (b) reduce metal fatigue
(c) reduce proximity effect (d) both (b) and (c)

136. The method suitable for heating of a conducting medium is
(a) Induction heating (b) Indirect arc heating
(c) Eddy current heating (d) Resistance heating

137. A power plant has to supply loads as follows :
12 pm to 5 am = 500 kW; 2 pm to 5 pm = 2500 kW
5 am to 10 am = 800 kW; 5 pm to 8 pm = 2000 kW
10 am to 12 noon = 2000 kW; 8 pm to 10 pm = 1500 kW
12 noon to 2 pm = 1000 kW; 10 pm to 12 pm = 1000 kW
Total units during 24 hours and load factor will be respectively
(a) 51.66 units, 31% (b) 31k units, 51.66%
(c) 31k units, 33% (d) None of the above

138. A large size synchronous generator is protected against overloads by
(a) over current relay (b) mho relay
(c) temperature sensitive relay (d) Buchholz relay

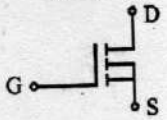
139. Earth resistance comprises of
A. Resistance of soil away from electrode.
B. Contact resistance between electrode and soil.
C. Resistance of metal electrode
(a) A only (b) A and B only
(c) A and C only (d) A, B and C together

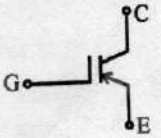
140. When cathode is positive with respect to anode in an SCR, the number of blocked p-n junctions is
(a) 1 (b) 2 (c) 3 (d) 4

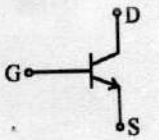
141. If a forward voltage (less than forward breakover voltage) is suddenly applied across anode and cathode of a thyristor, it may result into
(a) Damage to the thyristor
(b) Premature triggering of the thyristor because of high dV/dt
(c) Reduced holding current of the thyristor
(d) All of the above

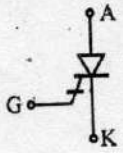
142. Match the List-I and List-II below :

List – I

1. 

2. 

3. 

4. 

List – II

A. GTO

B. Thyristor

C. MOSFET

D. SIT

E. IGBT

	1	2	3	4
(a)	A	C	B	E
(b)	A	B	C	D
(c)	C	E	B	A
(d)	C	E	D	A

143. The average gate power dissipation for an SCR is 0.5 W. Gate voltage variation is 2 V to 10 V. Which of the following is true ?

(a) $V_g = 2\ V, I_g = 0.25\ A$; $V_g = 10\ V, I_g = 0.05\ A$

(b) $V_g = 2\ V, I_g = 0.05\ A$; $V_g = 10\ V, I_g = 0.25\ A$

(c) $V_g = 2\ V, I_g = 10\ A$; $V_g = 10\ V, I_g = 2\ A$

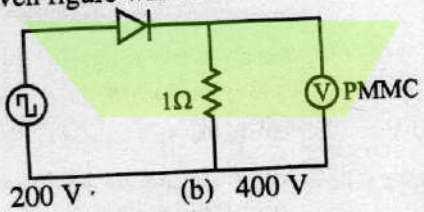
(d) None of the above

144. In a thyristor d.c. chopper, which type of commutation results in best performance ?

(a) Voltage commutation (b) Current commutation

(c) Load commutation (d) Supply commutation

145. For a symmetrical square wave of 800 V peak to peak and for ideal diode, the voltmeter in the given figure will read



(a) 200 V (b) 400 V (c) 800 V (d) zero

146. The power supply whose output voltage varies with variation in input voltage or output load current is known as

(a) Regulated Power Supply (b) Unregulated Power Supply

(c) Uninterruptible Power Supply (d) Switched Mode Power Supply

147. For an SCR, dV/dt protection is achieved by the use of

(a) RL in series with SCR (b) L in series with SCR

(c) RC in series with SCR (d) RC across SCR

148. SMPS are superior to linear power supplies in respect of

(a) size and efficiency (b) efficiency and regulation

(c) regulation and noise (d) noise and cost

149. A single phase, half-wave, controlled rectifier has 400 sin (314 t) as the input voltage and R as the load. For a firing angle of 60° for the SCR, the average output voltage is

(a) $240/\pi$ (b) $400/\pi$ (c) $300/\pi$ (d) $200/\pi$

150. Which of the following modulation techniques is mostly used in inverters ?

(a) Pulse width modulation (b) Square wave output modulation

(c) Both (a) and (b) (d) Neither (a) nor (b)

151. An IGBT has three terminals called

(a) Collector, Emitter and Base (b) Drain, Source and Base

(c) Drain, Source and Gate (d) Collector, Emitter and Gate

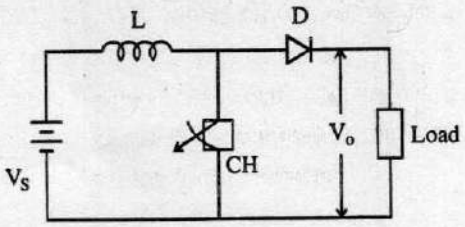
152. A UPS commonly has following parts :

(i) rectifier (ii) inverter (iii) static switch

Which of the following is true ?

(a) only (i) (b) only (i) and (ii)

(c) (i), (ii) and (iii) (d) only (ii) and (iii)

153. 

If α is the duty cycle type and output voltage of the chopper circuit above is

(a) step up, αV_S (b) step down, αV_S

(c) Step down, $\frac{V_S}{1-\alpha}$ (d) Step up, $\frac{V_S}{1-\alpha}$

154. When the SCR conducts, the forward voltage drop will

(a) 0.7 V at all load current (b) 2 to 2.5 V at all load current

(c) increases slightly with load current (d) remains constant with load current

155. A separately excited dc motor is required to be controlled, from a 3-phase supply, for its operation in the first quadrant only. The most preferred converter would be

(a) 3-phase fully controlled converter

(b) 3-phase fully controlled converter with free wheel diode

(c) 3-phase dual converter

(d) 3-phase half wave converter

156. For an SCR with turn-on time of 5 microsecond, an ideal trigger pulse should have

(a) short rise time with pulse width = 3 µsec

(b) long rise time with pulse width = 6 µsec

(c) short rise time with pulse width = 6 µsec

(d) None of the above

157. Cyclo converter drives are generally employed in

(a) Traction (b) Milling

(c) Generating low frequencies (d) Generating pulses

158. In a dual converter, the circulating current

(a) allows smooth reversal of load current but increases the response time.

(b) allows smooth reversal of load current with improved speed of response.

(c) does not allow smooth reversal of load current but reduces response time.

(d) flows only if there is no interconnecting conductor.

159. A cyclo converter is a

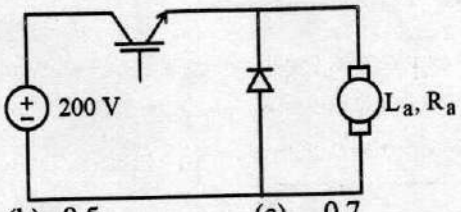
(a) naturally commutated device

(b) forced commutated device

(c) can be commutated in both manner

(d) None of the above

160. The separately excited dc motor in the figure below has a rated armature current of 20 A and a rated armature voltage of 150 V. An ideal chopper switching at 5 kHz is used to control the armature voltage. If L_a = 0.1 mH, R_a = 1Ω, neglecting armature reaction, the duty ratio of the chopper to obtain 50% of the rated torque at the rated speed and the rated field current is



(a) 0.4 (b) 0.5 (c) 0.7 (d) 0.8

161. An open-loop system is better than a closed-loop system in terms of
(a) Accuracy (b) Stability (c) Noise reduction (d) Sensitivity

162. A CRO cannot be used for direct measurement of
(a) Voltage (b) Current (c) Frequency (d) Power

163. The cycle time of a PLC is the time it takes to
(a) read all the input signals.
(b) read all the input signals, run the program and update outputs.
(c) read an input signal.
(d) check all the input signals against the program.

164. The thermocouple pair that gives the maximum sensitivity around 273 °k is
(a) Platinum – Constantan (b) Nichrome – Constantan
(c) Nickel – Constantan (d) Copper – Nickel

165. An inverse transducer converts
(a) electrical energy to any other form of energy
(b) electrical energy to light energy
(c) mechanical displacement into electrical signal
(d) electrical energy to mechanical form

166. Optical Pyrometer is used to measure
(a) Light Intensity (b) Low Temperature
(c) High Temperature (d) Light Intensity & High Temperature

167. Horizontal deflection plates of CRO are placed generally
(a) Horizontal (b) Vertical (c) Diagonal (d) (a) or (b)

168. A controller essentially is a/an
(a) Amplifier (b) Sensor (c) Comparator (d) Clipper

169. Programming Languages for PLC is/are
(a) Ladder Diagram (b) Function Block Diagram
(c) Structured Text (d) All of the above

170. To measure insulation resistance of equipments of voltage rating upto 440 V the megger generator must generate
(a) 220 V (b) 440 V (c) 500 V (d) None of these

171. Lissajous pattern obtained on a CRO screen is a circle. Frequency of two signals are
(a) Equal (b) Unequal (c) Zero (d) Infinity

172. Indicating instruments should be
(a) undamped (b) critically damped
(c) over damped (d) under damped

173. A megger is to measure insulation resistance of a cable. The cable should be connected to
(a) Battery (b) DC supply (c) AC supply (d) No supply

174. A strain gauge is a passive transducer and is employed for converting
(a) Pressure into change in resistance
(b) Force into displacement
(c) Mechanical displacement into a change of resistance
(d) None of the above

175. A megger is basically a/an
(a) Moving iron type instrument (b) Moving coil type instrument
(c) Hot wire instrument (d) Electrolytic instrument

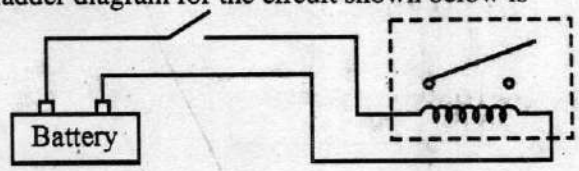
176. The dynamic characteristics of capacitive transducer are similar to those of
(a) Low-pass filter (b) High-pass filter
(c) Notch filter (d) Band-stop filter

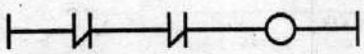
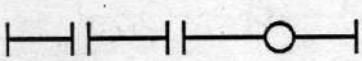
177. The insulation resistance test is performed on power lines with
(a) ohm meter (b) earth tester
(c) megger (d) Any of these

178. Piezo meter is used to measure
(a) Very high pressure (b) Very low pressure
(c) Displacement (d) None of these

179. Which of the following devices is used to measure flow in an open channel ?
(a) Venturimeter (b) Rota meter
(c) Orifice (d) Pitot tube

180. The ladder diagram for the circuit shown below is



(a) 
(b) 
(c) 
(d)