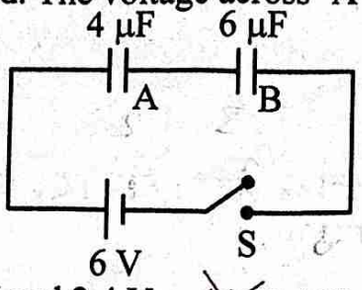
UKPSC
JE
Previous Year Paper
(Electrical) Paper-I
27 Dec, 2023

1. Transformer cores are laminated in order to
(a) simplify its construction (b) minimize eddy current loss
(c) reduce cost (d) reduce Hysteresis loss

2. Two capacitors are connected as shown in figure below. When switch 'S' is pressed both the capacitors get fully charged. The voltage across 'A' and 'B' are



(a) 3 V and 3 V (b) 3.6 V and 2.4 V (c) 2.4 V and 3.6 V (d) 6 V and 6 V

3. The surge impedance of a 100 km long underground cable is 50 Ω. The surge impedance of 50 km length of similar cable would be
(a) 50 Ω (b) 100 Ω (c) 25 Ω (d) 80 Ω

4. If the conductor diameter decreases, the inductance of the line
(a) decreases (b) increases (c) remains same (d) None of these

5. The maximum demand of a consumer is 2 kW and his daily energy consumption is 20 units. His load factor is
(a) 10% (b) 41.6% (c) 50% (d) None of these

6. Cables used for 220 kV lines are invariably
(a) compressed oil or compressed gas insulated
(b) paper insulated
(c) mica insulated
(d) None of these

7. With the rise in temperature, the insulation resistivity
(a) remains unchanged (b) increases linearly
(c) decreases linearly (d) reduces exponentially

8. The capacitance of a cable increases
(a) linearly with the increase in cable length
(b) linearly with the decrease in cable length
(c) exponentially with increase in cable length
(d) None of these

9. For DC generator which statement applies in case of field winding ?
(a) It is always placed on stator. (b) It is always placed on rotor.
(c) It may be placed either on stator or rotor. (d) None of these

10. The energy stored in the magnetic field of air cored solenoid 30 cm long and 3 cm diameter wound with 1000 turns of wire carrying a current of 10 A is
(a) 0.015 Joule (b) 0.15 Joule (c) 0.5 Joule (d) 1.15 Joule

11. What is the turns-ratio of the transformer needed to match a 1 kΩ source resistance to a 160 Ω load ?
(a) 2.5 : 1 (b) 16 : 1 (c) 4 : 1 (d) 25 : 4

12. A penstock is used as a conduit between
(a) the steam chest and the turbine in a thermal station
(b) the dam and the turbine in a hydro station
(c) the turbine and the discharge drain
(d) None of these

13. Thermal energy of a diatomic molecule is given by
where, k = Boltzmann's constant
T = temperature
(a) kT (b) $\frac{1}{2}kT$ (c) $\frac{5}{2}kT$ (d) $\frac{3}{2}kT$

14. Which metal has the highest melting point ?
(a) Copper (b) Aluminium (c) Tungsten (d) Nickel

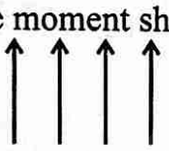
15. A small percentage of cadmium is added in copper to increase its
(a) conductivity (b) mechanical strength
(c) melting point (d) All of these

16. Thermocouple was discovered by
(a) Seebeck (b) Thomson (c) Peltier (d) None of these

17. Mobility of electron is highest in which metal ?
(a) Gold (b) Silver (c) Copper (d) Aluminium

18. Material having negative values of susceptibility of 10^{-4} to 10^{-6} order are
(a) diamagnetic (b) paramagnetic (c) ferromagnetic (d) None of these

19. The dipole moment shown in the figure represents

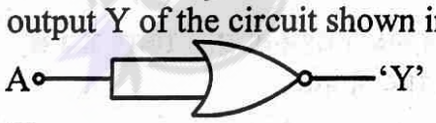


(a) Paramagnetic material (b) Diamagnetic material
(c) Ferromagnetic material (d) Antiferromagnetic material

20. What is the value of 'b' in the conversion $(16)_{10} = (100)_b$?
(a) 2 (b) 8 (c) 4 (d) 6

21. 2's complement of the number $(1010101)_2$ is
(a) 0101010 (b) 0101011 (c) 1101010 (d) 1110011

22. The output Y of the circuit shown in figure below is



(a) $\overline{A}$ (b) 0 (c) $A\overline{A}$ (d) 1

23. To obtain the minimum value of stress in cables, the ratio (R/r) should be
where, R – Inner radius of sheath
r – radius of the conductor
(a) 2.13 (b) 2.718 (c) 1.96 (d) 1.5

24. Which of the Power Plant is least reliable ?
(a) Wind (b) Tidal (c) Geothermal (d) Solar

25. Hydrograph is similar to
(a) Load duration curve (b) Mass curve
(c) Energy load curve (d) Chronological load curve

26. Which of the following equipment is equally accurate in both AC as well as DC circuits ?
(a) Induction Wattmeter (b) Dynamometer Wattmeter
(c) PMMC Ammeter (d) Electrostatic Ammeter

27. A moving iron meter is used for the measurement of
(a) DC only (b) AC only
(c) AC with diode (d) Both AC and DC circuits

28. Which one of the following is the dimension of resistance ?
(a) ML^2/QT (b) ML/Q^2T (c) ML^2/Q^2T (d) ML^2/QT^2

29. The torque to weight ratio of an instrument is used to calculate
(a) accuracy (b) precision (c) selectivity (d) sensitivity

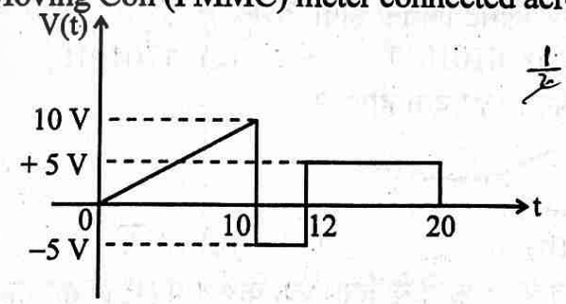
30. In an electrodynamometer type wattmeter, in reference to current coil and pressure coil
(a) the current coil is fixed. (b) the pressure coil is fixed.
(c) any of the two coils can be made fixed. (d) both the coils should be movable.

31. In a 3-phase power measurement by two wattmeter method, at unity power factor
(a) both wattmeter readings will be equal and will measure half of the total power.
(b) one wattmeter will show total power and the other zero.
(c) both will show same power readings but of opposite sign.
(d) one wattmeter will show twice the power shown by the other wattmeter.

32. In Spring Controlled Moving Iron instruments, the scale is
(a) uniform
(b) cramped at the lower end and expanded at the upper end
(c) expanded at the lower end and cramped at the upper end
(d) None of these

33. A 2 milli ampere ammeter has a resistance of 100 Ω. It is to be converted to a 1 ampere ammeter. The value of shunt resistance required is
(a) 0.002 Ω (b) 0.2004 Ω (c) 200000 Ω (d) 200 Ω

34. A periodic waveform (time period = 20 ms) observed on an oscilloscope across a load is shown. A Permanent Magnet Moving Coil (PMMC) meter connected across the same load reads



(a) 4 Volts (b) 5 Volts (c) 10 Volts (d) 2 Volts

35. In a Permanent Magnet Moving Coil instrument, the deflecting torque is proportional to
(a) Square of current (b) Current
(c) Square root of current (d) Sine of current

36. Electrostatic instrument measures
(a) AC only (b) DC only
(c) DC and AC voltage (d) DC voltage only

37. The household energymeter is
(a) an indicating instrument (b) a recording instrument
(c) an integrating instrument (d) None of these

38. Which of the following controls the speed of an Energy Meter ?
(a) Shunt Magnet (b) Series Magnet (c) Shading Band (d) Braking Magnet

39. Gross error occurs due to
(a) human error (b) instrumental error
(c) environmental error (d) random error

40. In a 3-phase dynamometer type power factor meter, the planes of the two moving coils are inclined at an angle of
(a) 30° (b) 60° (c) 90° (d) 120°

41. Hot wire ammeters are used for measuring
(a) Both AC and DC (b) AC only
(c) DC only (d) Temperature only

42. Which of the following is a current sensitive instrument ?
(a) Electrostatic instrument (b) Cathode ray oscilloscope
(c) Electrodynamometer wattmeter (d) PMMC instrument

43. What is the smallest change in the input signal that can be detected by an instrument ?
(a) Sensitivity (b) Resolution (c) Precision (d) Accuracy

44. The errors that occur after taking care of all the gross and systematic errors are called
(a) Random errors (b) Instrumental errors
(c) Environmental errors (d) Limiting error

45. Error detector is also known as
(a) Comparator (b) Integrator (c) Differentiator (d) Decoder

46. A 100 milli ampere meter has an accuracy of ± 2% of full scale deflection. Its limiting error while reading 10 milli ampere will be
(a) ± 0.2% (b) ± 2.0% (c) ± 20% (d) ± 10%

47. In measuring instruments, under equilibrium condition, controlling torque (T_c) and deflecting torque (T_d) are
(a) $T_d = 0$ (b) $T_c < T_d$ (c) $T_c > T_d$ (d) $T_c = T_d$

48. A Megger is used for the measurement of
(a) low and medium valued resistances
(b) medium and high valued resistances
(c) high valued resistances particularly Insulation resistances
(d) All of these

49. The resistance required for critical damping in a circuit is 1000 Ω. The galvanometer circuit has a resistance of 850 Ω. The galvanometer circuit is
(a) underdamped (b) undamped (c) overdamped (d) None of these

50. Which of the following is an absolute measuring instrument ?
(a) moving coil meter (b) tangent galvanometer
(c) permanent magnet meter (d) moving iron meter

51. Which of the following is responsible for producing a deflecting torque ?
(a) Magnetic effect (b) Damping effect (c) Controlling system (d) All of these

52. Damping torque is provided in
(a) Indicating instruments (b) Recording instruments
(c) Integrating instruments (d) None of these

53. The thickness of insulation layer provided on the conductor in cable depends upon
(a) operating voltage (b) current to be carried
(c) power factor (d) Both (b) & (c)

54. A synchronous condenser is a
(a) Synchronous generator (b) Paper condenser
(c) Synchronous motor (d) None of these

55. The transmission capacity of a line at 50 Hz frequency as compared to that at 60 Hz frequency is
(a) lower (b) higher (c) equal (d) None of these

56. A transmission line is distortionless if
(Given R = Resistance, L = Inductance, C = Capacitance and G = Conductance)
(a) RG = LC (b) RC = GL (c) R/C = G/L (d) R = G

57. Surge impedance value for cables, in comparison to overhead lines is
(a) higher (b) lower (c) of the same order (d) None of these

58. The characteristic impedance of a transmission line depends upon
(a) shape of the conductor
(b) conductivity of the conductor material
(c) geometrical configuration of the conductor
(d) None of these

59. A 50 Ω distortionless transmission line has a capacitance of 10^{-10} Farad/meter. What is its inductance per meter ?
(a) 0.25 μH (b) 500 μH (c) 5000 μH (d) 50 μH

60. The characteristic impedance of a transmission line with series impedance 'Z' ohms per unit length and shunt admittance 'Y' Mhos per unit length is given by
(a) $(Z + Y)^2$ (b) $\sqrt{Z \cdot Y}$ (c) $\sqrt{Z/Y}$ (d) $\sqrt{(Z/Y)^2}$

61. Graphite is used in nuclear power plant as
(a) Fuel (b) Coolant (c) Moderator (d) Electrode

62. What will happen to the operating torque of a moving iron instrument, if the current through the operating coil is halved ?
(a) Remains same (b) Doubles
(c) Is halved (d) Becomes one fourth

63. To reduce loading effect, an instrument must possess
(a) Low input impedance (b) High input impedance
(c) Zero input impedance (d) Unity input impedance

64. Schering bridge is used to measure the unknown
(a) Inductance (b) Capacitance (c) Resistance (d) Frequency

65. A single phase 3 wire AC system is made up of
(a) 1 conductor wire, 1 neutral (b) 2 conductor wire, 1 neutral
(c) 3 conductor wire, 1 neutral (d) 1 conductor wire, 2 neutral

66. In a parallel plate capacitor a dielectric slab is introduced, the potential difference between the plates will
(a) increase (b) decrease (c) remain same (d) become zero

67. The capacitance of a transmission line is a
(a) Series Element (b) Shunt Element
(c) Neither Series nor Shut Element (d) None of these

68. The amount of heat produced by the complete combustion of a unit mass of the fuel is called
(a) Calorific value (b) Consumed value (c) Latent heat (d) None of these

69. Boron is used in nuclear reactor to
(a) control the nuclear chain reaction (b) accelerate the nuclear chain reaction
(c) slow down the speed of neutrons (d) None of these

70. The minority carriers in P-type semiconductor are
(a) Holes (b) Electrons (c) Holes and Electrons (d) Protons

71. Dielectric constant of Teflon is
(a) 4 (b) 3 (c) 2 (d) 1

72. Cold rolled grain oriented steel is widely used
(a) for making transformer core (b) for making electrical winding
(c) in chemical industries (d) None of these

73. The two important metals used for the fuse alloy are
(a) Iron and Nickel (b) Lead and Tin
(c) Aluminium and Copper (d) Zinc and Copper

74. The resistance of a voltmeter as compared to an ammeter is
(a) very low (b) very high
(c) equal (d) equal to twice the value

75. The controlling torque in a Megger is provided by
(a) Springs (b) Weights attached to the moving system
(c) It does not need any controlling torque (d) None of these

76. The function of economiser in thermal power plant is to
(a) heat the feed water using exhaust steam
(b) heat the feed water using exhaust gases
(c) heat the incoming air using exhaust gases
(d) heat the cooling water using exhaust steam

77. Which of the following causes maximum air pollution ?
(a) Hydroelectric Power Plant (b) Nuclear Power Plant
(c) Thermal Power Plant (d) Solar Power Plant

78. According to IS code, the colour of earth wire and neutral wire are respectively
(a) Green and Black (b) Green and Red
(c) Black and Green (d) Black and Red

79. Gas turbine plant may be
(a) open cycle plant only
(b) closed cycle plant only
(c) steam cycle or combined gas plant
(d) All of these

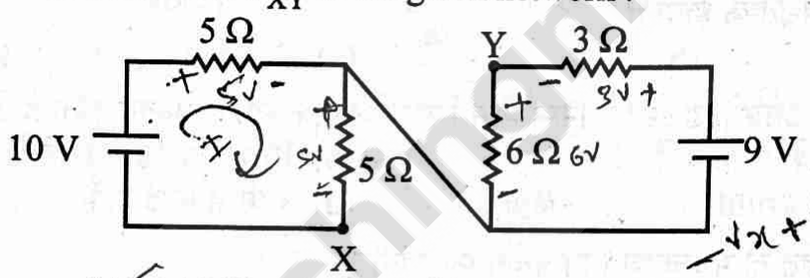
80. Which of the following generating stations has the requirement of minimum maintenance ?
(a) Hydro Power Station
(b) Thermal Power Station
(c) Diesel Power Station
(d) Nuclear Power Station

81. Bronze is an alloy of
(a) Copper – Tin
(b) Copper – Nickel
(c) Copper – Cadmium
(d) Copper – Chromium

82. The approximate percentages of copper and zinc in brass are respectively
(a) 60% and 40% (b) 40% and 60% (c) 50% and 50% (d) 55% and 45%

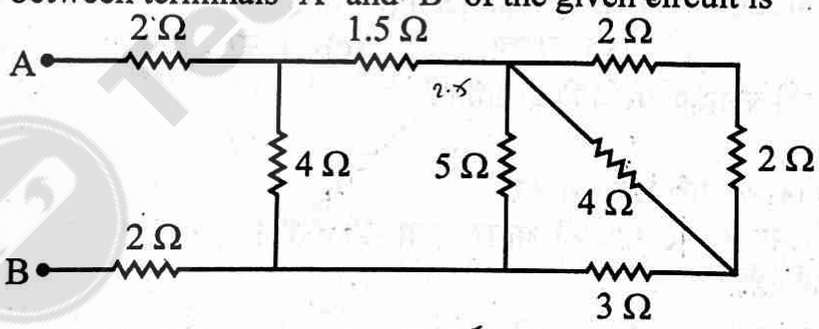
83. The efficiency of a transformer is maximum when
(a) it runs at full load
(b) it runs at half full load
(c) it runs at no load
(d) None of these

84. Obtain the potential difference V_{XY} in the given network :



(a) + 1 V (b) + 11 V (c) – 1 V (d) + 6 V

85. The resistance between terminals 'A' and 'B' of the given circuit is



(a) 4 Ω (b) 8 Ω (c) 6 Ω (d) 2 Ω

86. In hydroelectric power stations, which of the following acts as safety valves ?
(a) Turbines (b) Spillways (c) Penstocks (d) None of these

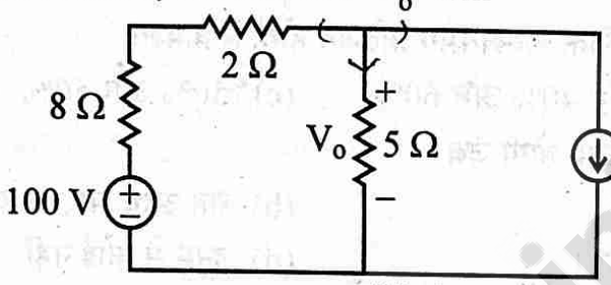
87. Plutonium-239 is an element of which type ?
(a) Naturally occurring
(b) Artificially made
(c) Non-radioactive
(d) Electrically neutral

88. Nuclear reactors generally employ
(a) Fusion
(b) Fission
(c) Both Fusion and Fission
(d) None of these

89. Two bulbs of 30 watt and 80 watt rating are connected in series across the mains then which of the following alternative is correct ?
(The voltage ratings of the two bulbs is same as the voltage of the mains.)
(a) The bulbs together consume 110 watts. (b) The bulbs together consume 55 watts.
(c) The 30 watt bulb glows brighter. (d) The 80 watt bulb glows brighter.

90. A capacitor stores energy in which of the following ?
(a) Electromagnetic field (b) Magnetic field
(c) Electric field (d) Magnetic and Electromagnetic field

91. In the given circuit, the voltage across 5 Ω resistor is 'V_o'. If a 5 Ω resistor is connected in series with 5 A current source, the value of 'V_o' will

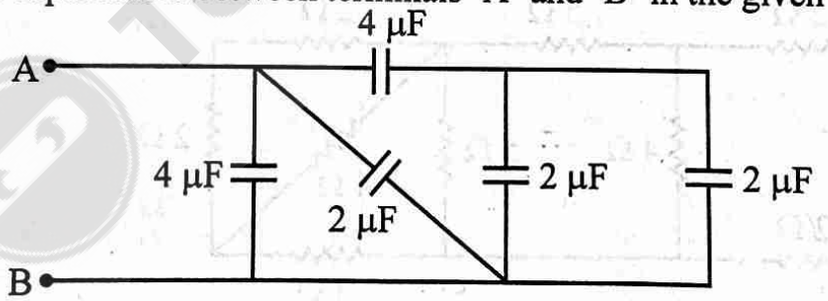


(a) decrease (b) increase
(c) remain unchanged (d) get doubled

92. An electric device is rated 10 kVA, 200 V at 0.6 power factor lag. What is the impedance of the device ?
(a) $(4 + j4)\ \Omega$ (b) $(1.2 + j1.6)\ \Omega$ (c) $(2.4 - j3.2)\ \Omega$ (d) $(2.4 + j3.2)\ \Omega$

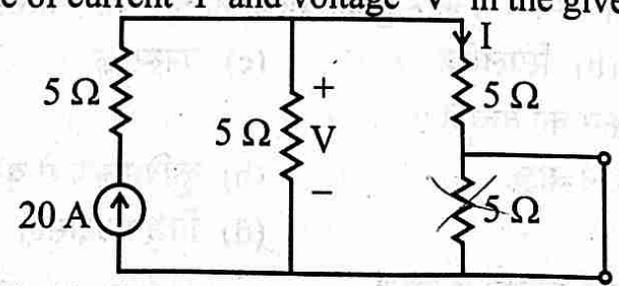
93. What is the instantaneous value of voltage $V = 5 \sin (2\pi \times 10^4 t)$ at time $t = 25\ \mu$ sec ?
(a) 0 V (b) $\frac{5}{\sqrt{2}}$ V (c) 5 V (d) 2.5 V

94. The equivalent capacitance between terminals 'A' and 'B' in the given circuit is



(a) 2 μF (b) 4 μF (c) 6 μF (d) 8 μF

95. What will be the value of current 'I' and voltage 'V' in the given circuit ?



(a) 13.33 A, 100 V (b) 13.33 A, 38.35 V (c) 10 A, 50 V (d) 10 A, 100 V

96. The internal resistance of an ideal current source is
(a) 0 Ω (b) 1 Ω (c) 100 Ω (d) None of these

97. In two wattmeter method of three phase power measurement, if one of the wattmeter shows zero reading, then it can be concluded that the power factor of the load is

(a) 0.5 (b) unity (c) zero (d) $\frac{\sqrt{3}}{2}$

98. The angle between line current and respective phase current in a delta connection is (ϕ = phase angle of the load)

(a) 45° (b) 30° (c) $30° + \phi$ (d) $45° + \phi$

99. Three capacitors of 6 μF each are connected in delta. The capacitance of each capacitor in an equivalent star connected load is

(a) $\frac{2}{3}$ μF (b) 18 μF (c) 36 μF (d) 2 μF

100. Resistivity of a semiconductor depends upon

(a) atomic nature of semiconductor
(b) shape of semiconductor
(c) shape and atomic weight of the semiconductor
(d) length of semiconductor

101. In a semiconductor, the energy gap between valence band and conduction band is nearly

(a) zero (b) 5 eV (c) 1 eV (d) 15 eV

102. Leakage current across a P-N junction is due to

(a) minority carriers (b) majority carriers
(c) junction capacitance (d) depletion layer

103. Depletion region is the zone which contains :

(a) electrons only (b) holes only
(c) neither electrons nor holes (d) both electrons and holes

104. In a transistor, if $\beta = 9.0$, α will be

(a) 0.01 (b) 0.09 (c) 0.1 (d) 0.9

105. In a transistor $\beta = 40$ and $I_B = 25$ μA. Then the value of I_E is

(a) 1 mA (b) 0.975 mA (c) 1.025 mA (d) 1.25 mA

106. The unit of permeability is
where, AT – ampere turn
Wb – Weber
m – Meter

(a) AT/Wb (b) Wb/AT-m (c) AT (d) AT/m

107. What is the correct relationship between two coupled inductors L_1 and L_2 and their mutual inductance M ?

(a) $M \le \sqrt{L_1 L_2}$ (b) $M > \sqrt{L_1 L_2}$ (c) $M = \sqrt{L_1^2 + L_2^2}$ (d) $M > \frac{L_1 + L_2}{2}$

108. The expression of total reactive power in a 3-phase balanced load system is

(a) $V_L I_L \cos\phi$ (b) $3 V_L I_L \sin\phi$ (c) $\sqrt{3} V_L I_L \sin\phi$ (d) $\sqrt{3} V_L I_L \cos\phi$

109. Positive feedback is used in
(a) Oscillator (b) Detector (c) Rectifier (d) Amplifier

110. The relation between voltage gain with negative feedback 'A_f' and without feedback 'A' is (where β is the feedback factor)
(a) $A_f = \frac{A}{1+\beta A}$ (b) $A_f = \frac{A}{1-\beta A}$ (c) $A_f = A(1+\beta A)$ (d) $A_f = A(1-\beta A)$

111. Which of the following materials have highest resistivity ?
(a) Conductor (b) Semiconductor (c) Super-conductor (d) Insulator

112. Which of the following has negative temperature coefficient of resistance ?
(a) Gold (b) Silver (c) Carbon (d) Platinum

113. Semiconductor materials have which type of bond ?
(a) Electrovalent (b) Covalent (c) Ionic (d) Electrolytic

114. Doping materials are called impurities because they :
(a) alter crystal structure of pure semiconductor
(b) increase the size of carriers
(c) decrease the size of carriers
(d) None of these

115. A material for good magnetic memory should have
(a) high permeability (b) high retentivity
(c) low hysteresis loss (d) high mechanical strength

116. The temperature at which iron ceases to be ferromagnetic and becomes paramagnetic is :
(a) Weiss point (b) Curie point
(c) Melting point (d) Ferromagnetic point

117. Which one of the following is not a diamagnetic material ?
(a) Nickel (b) Copper (c) Bismuth (d) Antimony

118. Which type of motor is used in cranes ?
(a) DC Compound (b) DC Shunt (c) DC Series (d) Induction

119. The primary and secondary windings of an ordinary transformer always have
(a) same number of turns (b) same amount of copper wire
(c) separate magnetic circuit (d) common magnetic circuit

120. Transformers are rated in which unit ?
(a) kVA (b) kW (c) kVAR (d) MVAR

121. Current flow through the base of either a PNP or an NPN transistor is by
(a) diffusion (b) electrons (c) holes (d) majority carriers

122. The gain of an RC coupled amplifier
(a) falls at high frequency only (b) falls at low frequency only
(c) falls at high and low frequency both (d) remains constant at all frequencies

123. Negative feedback in an amplifier results in
(a) increased gain but reduced bandwidth (b) increased gain and increased bandwidth
(c) reduced gain but increased bandwidth (d) reduced gain and reduced bandwidth

124. For a given cross-sectional area of a transformer core, stepped cores are used to
(a) reduce the core loss (b) provide mechanical strength to the core
(c) reduce the conductor material and therefore I^2R losses
(d) reduce the magnetizing current

125. A time varying flux causes an induced electromotive force. What law does this statement represent ?
(a) Ampere's law (b) Faraday's law (c) Lenz's law (d) Ohm's law

126. In a DC motor, the windage loss is proportional to
(a) supply voltage (b) square of the supply voltage
(c) flux density (d) square of the armature speed

127. Which of the following is not a part of DC motor ?
(a) Armature (b) Commutator (c) Damper winding (d) Field winding

128. The air gap between the Yoke and armature in a DC motor is kept small
(a) to achieve a stronger magnetic field (b) to avoid overheating of the machine
(c) to avoid locking of the armature (d) to avoid transverse motion

129. Laminated Yoke in DC motor can reduce
(a) speed regulation (b) iron loss
(c) temperature rise (d) sparking on load

130. The commutator in a DC motor serves purpose of
(a) Changing AC to DC (b) Converting DC to AC
(c) Reducing Friction (d) Avoiding sparking at the brushes

131. In a DC machine, the wave winding is employed for which of the rating ?
(a) High current and low voltage (b) Low current and high voltage
(c) High current and high voltage (d) Low current and low voltage

132. In Lap winding, the number of brushes is always having the following relation with the number of poles.
(a) Double (b) Equal
(c) Half (d) Always two brushes are there

133. Welding generator will have
(a) Lap winding (b) Wave winding
(c) Either Lap or wave winding (d) None of these

134. If DC supply is given to a transformer, it will
(a) not work and may get damaged (b) work but not accurately
(c) work properly (d) None of these

135. Hysteresis loss in a transformer depends upon which of the below ?
(a) Load current (b) Type of lamination (c) Frequency (d) None of these

136. The function of oil in a transformer is to provide
(a) lubrication (b) support
(c) protection against lightening (d) cooling

137. The induced emf in the armature conductor of a DC machine is
(a) sinusoidal (b) trapezoidal
(c) rectangular unidirectional (d) triangular

138. Series field winding of a DC machine consists of
(a) Few turns of thick wire (b) Few turns of thin wire
(c) Many turns of thick wire (d) Many turns of thin wire

139. The armature current in a DC shunt generator is given as
where, E_g – Generated voltage
V_t – Terminal voltage
R_a – Armature resistance
I_L – Load current

$I_g = \frac{E_g - V_t}{R_a}$

(a) $\frac{E_g + V_t}{R_a}$ (b) $\frac{E_g}{R_a}$ (c) $\frac{E_g - V_t}{R_a}$ (d) I_L

140. With the increase in the field excitation of a DC generator, its generated emf $E = P\phi ZN / 60A$
(a) increases
(b) decreases
(c) remains constant
(d) increases upto a limit and then remains almost constant

141. The fall in speed of DC generator due to increase in load can be corrected by
(a) cooling the armature (b) increasing the input to the Prime Mover
(c) increasing the excitation (d) reducing the load voltage

142. In a communication system, noise is most likely to affect the signal
(a) at the transmitter only (b) in the channel
(c) in the information source (d) at the destination

143. The modulation index of an AM wave is changed from 0 to 1. The transmitter power is
(a) unchanged (b) halved (c) doubled (d) increased by 50%

144. A superheterodyne receiver with an intermediate frequency 'IF' of 450 kHz is tuned to signal at 1200 kHz. The image frequency is
(a) 750 kHz (b) 900 kHz (c) 1650 kHz (d) 2100 kHz

145. The dummy coils in DC machine are useful to
(a) increase the efficiency
(b) improve the commutation
(c) reduce the cost of the machine
(d) maintain mechanical balance of the armature

146. In a DC generator, the ripples in the direct emf generated are reduced by employing
(a) Commutator with larger number of segments
(b) Equalizer rings
(c) Carbon brushes
(d) Graphite brushes

147. In a DC machine, the air gap flux distribution in space at no load is
(a) sinusoidal (b) triangular (c) flat topped (d) pulsating

148. A silicon diode is preferred to a germanium diode because of its
(a) higher reverse current
(b) lower reverse current and higher breakdown voltage
(c) higher reverse current and lower breakdown voltage
(d) None of these

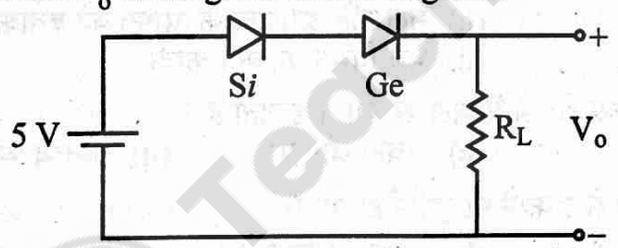
149. Among these which material is a donor material ?
(a) Gallium (b) Antimony (c) Boron (d) Indium

150. The AC resistance of a forward biased P-N Junction diode operating at bias voltage 'V' and carrying current 'I' is
(a) zero
(b) a constant value independent of 'V' and 'I
(c) $\frac{V}{I}$
(d) $\frac{\Delta V}{\Delta I}$

151. If 'w' is the width of depletion region in a PN junction diode, the transition capacitance is proportional to
(a) w (b) w^2 (c) $\frac{1}{w}$ (d) $\frac{1}{w^2}$

152. Small recovery time of a diode is most significant for
(a) line frequency rectification
(b) low frequency rectification and switching operation
(c) high frequency rectification and switching operation
(d) switching operation only

153. Find the V_o in the given circuit diagram :



(a) 4 V (b) 3 V (c) 4.5 V (d) 3.3 V

154. In a transistor the current amplification factor alpha d.c. (α_{dc}) is given by
(a) I_C/I_E (b) I_E/I_B (c) I_B/I_E (d) I_B/I_C

155. Quantization noise occurs in which of the following ?
(a) Time division multiplex
(b) Frequency division multiplex
(c) Pulse code modulation
(d) Pulse width modulation

156. Nyquist sampling rate can be correctly represented as
where, f_s = Sampling frequency
f_m = Signal frequency
(a) $f_s < 2f_m$ (b) $f_s \leq 2f_m$ (c) $f_s \geq 2f_m$ (d) $f_s = f_m$

157. The maximum frequency deviation for the signal
$X_C(t) = 10 \cos[(10^{10}\pi t) + 10 \sin(2\pi 10^4 t)]$
(a) 75 kHz (b) 10 kHz (c) 60 kHz (d) 100 kHz

158. Crossover distortion behaviour is a characteristic of
(a) Class 'A' output stage (b) Class 'B' output stage
(c) Class 'AB' output stage (d) Common base output stage

159. What is the main source of distortion in a push-pull amplifier ?
(a) Fundamental component (b) Second harmonic
(c) Third harmonic (d) All even harmonics

160. Oscillators use following feedback.
(a) Negative (b) Positive
(c) Negative and Positive, any one (d) None of these

161. The Barkhausen criterion for sustained oscillations is given by
(a) $|A\beta| \neq 1$ (b) $|A\beta| = 1$ (c) $|A\beta| < 1$ (d) $\angle A\beta = 180°$

162. The frequency of oscillation of a Hartley Oscillator is
(a) $\omega = 1/LC$ (b) $\omega = 1/\sqrt{LC}$ (c) $\omega = 2\pi LC$ (d) $\omega = 2\pi f\sqrt{LC}$

163. A crystal oscillator is frequently used in digital circuits for timing purposes because of its
(a) low cost (b) high frequency stability
(c) simple circuitry (d) ability to set the frequency at desired value

164. In a RC phase shift oscillator the minimum number of RC networks to be connected in cascade will be
(a) one (b) two (c) three (d) four

165. Ultraviolet radiation is used in IC fabrication process for
(a) diffusion (b) masking (c) isolation (d) metalization

166. In an integrated circuit the SiO_2 layer provides
(a) electrical connection to external circuit (b) physical strength
(c) isolation (d) conducting path

167. In MOSFET fabrication, the channel length is defined during the process of
(a) isolation oxide growth (b) channel stop implantation
(c) polysilicon gate patterning (d) None of these

168. The cascode amplifier is a multistage configuration of
(a) CC – CB (b) CE – CB (c) CB – CC (d) CE – CC

169. Closed loop gain of a feedback amplifier is the gain obtained when
(a) its output terminals are closed. (b) negative feedback is applied.
(c) feedback loop is closed. (d) feedback factor exceeds unity.

170. The circuit efficiency of a class 'A' amplifier can be increased with
(a) Direct coupled load (b) Low DC power input
(c) Transformer coupled load (d) Low rating resistor

171. The maximum possible conversion efficiency of Class-B amplifier is
(a) 25% (b) 50% (c) 75% (d) 78.5%

172. Inverting op-amp is a
(a) Voltage shunt feedback (b) Voltage series feedback
(c) Current series feedback (d) Current shunt feedback

173. The DC shunt motor operating under unsaturated region develops the maximum mechanical power when the armature current is such that the motor back emf (E_b) and the applied voltage (V) to the motor terminals are related as
(a) $E_b = V$ (b) $E_b = V/2$ (c) $E_b = V/3$ (d) $E_b = V/4$

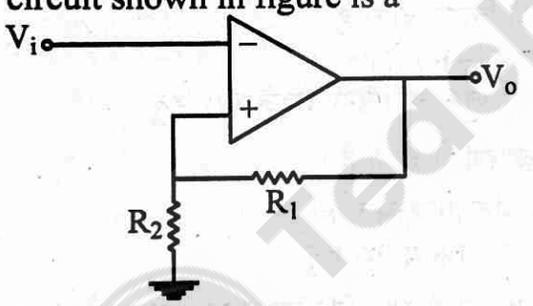
174. Which method can be used for the measurement of three phase power for an unbalanced load ?
(a) Three voltmeter (b) Two voltmeter and one ammeter
(c) Two wattmeter (d) One wattmeter

175. The meter constant of a single phase 230 V induction watt hour meter is 400 revolutions per kWh. The speed of the meter disc for a current of 10 A of 0.9 pf lagging will be
(a) 13.80 rpm (b) 16.02 rpm (c) 18.20 rpm (d) 21.10 rpm

176. For successful parallel operation of two single phase transformers, the most essential condition is that their
(a) percentage impedances are equal (b) polarities are properly connected
(c) turns-ratios are exactly equal (d) kVA ratings are equal

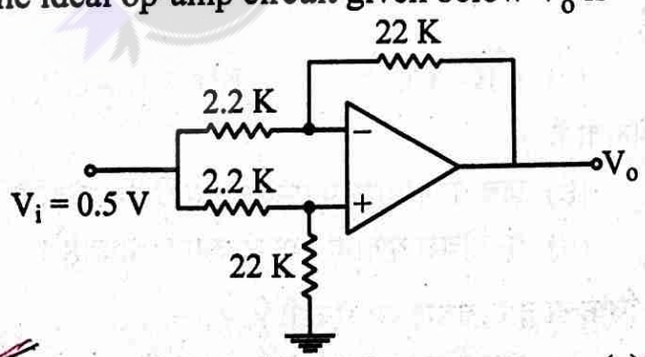
177. The work done in moving a charge on an equipotential surface is
(a) finite and positive (b) infinite
(c) finite and negative (d) zero

178. The circuit shown in figure is a



(a) Non-inverting amplifier (b) Inverting amplifier
(c) Oscillator (d) Schmitt trigger

179. In the ideal op-amp circuit given below V_o is



(a) −5 V (b) 5 V (c) 0 V (d) −2 V

180. The ideal op-amp has the following characteristics
(a) $R_i = \infty, R_o = 0, A = \infty$ (b) $R_i = 0, R_o = 0, A = \infty$
(c) $R_i = \infty, R_o = \infty, A = \infty$ (d) $R_i = 0, R_o = \infty, A = \infty$