Electrical Engineering (EE) Paper 1(MAY)
MAGDALINE COACHING CENTRE (mc^2)

(ANSWER KEY AT THE BOTTOM)

1. In any linear network, the elements like inductor, resistor and capacitor always _____
A) Exhibit changes due to change in temperature
B) Exhibit changes due to change in voltage
C) Exhibit changes due to change in time
D) Remains constant irrespective of change in temperature, voltage and time

2. Which law plays an important role in the loop analysis of a network?
A) KCL
B) KVL
C) Superposition theorem
D) None of the above

3. How is the loop analysis different in application/functioning level as compare to kirchoff's law?
A) Utilization of loop currents instead of branch currents for writing equations
B) Capability of branch current to carry multiple networks
C) Reduction in the number of unknowns for complex networks
D) All of the above

4. Which element behaves as an open circuit especially under the consideration of dc quantities?
A) Inductors
B) Resistors
C) Capacitors
D) All of the above

5. What will be the value of power factor for series RLC circuit under the resonance phenomenon?
A) 0
B) 0.5
C) 1
D) Infinity

6. Which among the following condition is true at resonance?
A) $X_C > X_L$
B) $X_C = X_L$
C) $X_C < X_L$
D) None of the above

7. Which among the following is regarded as "Dual of Thevenin's Theorem"?
A) Norton's Theorem
B) Superposition Theorem
C) Millman's Theorem
D) Maximum Power Transfer Theorem

8. How does the series resonant circuit behave under the resonance condition?
A) Current Amplifier
B) Transconductance
C) Voltage Regulator
D) Voltage Amplifier

9. Why does the superposition theorem not applicable to power?
A) Because it is proportional to square of current and current is a non-linear function
B) Because it is proportional to square of voltage and voltage is a non-linear function
C) Both A and B
D) None of the above

10. The rms value of the current in a wire which carries a d.c. current of 10 A and a sinusoidal alternating current of peak value 20 A is
A) 10 A
B) 14.14 A
C) 15 A
D) 17.32 A

11. An energy meter connected to an immersion heater (resistive) operating on an AC 230 V, 50 Hz, AC single phase source reads 2.3 units (kWh) in 1 hour. The heater is removed from the supply and now connected to a 400 V peak to peak square wave

source of 150 Hz. The power in kW dissipated by the heater will be
A) 3.478
B) 1.739
C) 1.540
D) 0.870

12. How many 200W/220V incandescent lamps connected in series would consume the same total power as a single 100W/220V incandescent lamp?
A) not possible
B) 4
C) 3
D) 2

13. Kirchoff's Voltage Law is related to
A) junction currents
B) battery e.m.f's
C) IR drops
D) both B and C

14. To determine the polarity of the voltage drop across a resistor, it is necessary to know
A) value of current through the resistor
B) direction of current through the resistor
C) value of resistor
D) e.m.f's in the circuit

15. "Any number of current sources in parallel may be replaced by a single current source whose current is the algebraic sum of individual source resistances"
The above statement is associated with
A) Thevenin's Theorem
B) Norton's Theorem
C) Millman's Theorme
D) Maximum Power Transfer Theorem

16. A capacitor is generally a
A) bilateral and active component
B) active, passive, linear and nonlinear component
C) linear and bilateral component
D) non linear and active component

17. Kirchoff's law is applicable to
A) passive networks only
B) a.c. only
C) d.c. only
D) both a.c. and d.c. circuits

18. Efficiency of power transfer when maximum power transfer occurs is
A) 100%
B) 80%
C) 75%
D) 50%

19. For maximum power transfer the internal resistance of the source should be
A) equal to load resistance
B) less than the load resistance
C) greater than the load resistance
D) none of the above

20. Which of the following is passive element?
A) capacitor
B) ideal voltage source
C) ideal current source
D) all of the above

(ANSWER KEY AT THE BOTTOM)

21. In a parallel RLC, the current at resonance is
A) maximum
B) minimum
C) zero
D) none of the above

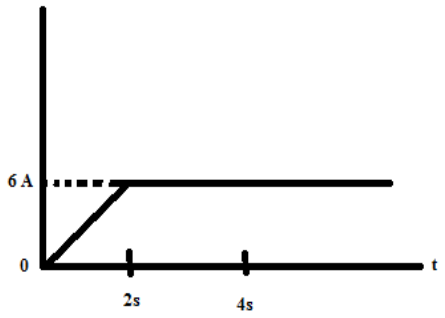
22. The reactance offered by a capacitor at 50 Hz is 20 Ω. If the frequency is increased to 100 Hz, reactance becomes ____ ?
A) 2.5 Ω
B) 5 Ω
C) 10 Ω
D) 15 Ω

23. A battery consists of 5 cells, each having an emf of 1.2 V and internal resistance of 0.4 Ω joined in series. If this battery supplies current to a 6 Ω resistor, what is the current supplied by the battery?
A) 0.75 A
B) 7.5 A
C) 0.57 A
D) 5.7 A

24. Load current in thevenin's theorem is given by
A) $I_L = \frac{V_{Th}}{R_{Th}}$
B) $I_L = \frac{V_{Th}}{R_{Th}} + R_{Th}$
C) $I_L = \frac{V_{Th}}{R_{Th}+R_L}$
D) $I_L = \frac{V_{Th}}{R_{Th}+R_L} I_{SC}$

25. The form factor (k_f)for sine wave is
A) 1.414
B) 0.707
C) 0.637
D) 1.11

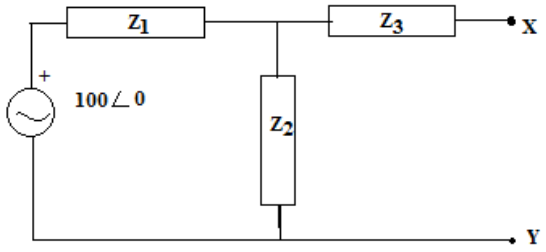
26. Figure shows the waveform of the current passing through an inductor of resistance 1 Ω and inductance of 2 H. the energy absorbed by the inductor in the first four seconds is



A) 144 J
B) 98 J
C) 132 J
D) 168 J

(ANSWER KEY AT THE BOTTOM)

27. In the figure, $Z_1 = 10\angle -60°, Z_2 = 10\angle 60°, Z_3 = 50\angle 53.13°$. Thevenin's impedance seen from X-Y is



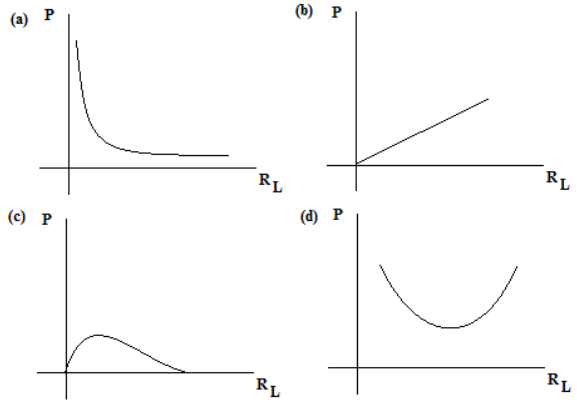
A) $56.66\angle 45°$
B) $60\angle 30°$
C) $70\angle 30°$
D) $34.4\angle 65°$

28. Assertion (a): Kirchoff's current law is valid for an ac circuit containing R, L and C.
Reason (r): The sum of RMS currents at any junction of the circuit is always zero.

Codes:
(A) Both a and r are true and r is the correct explanation of a.
(B) Both a and r are true but r is not the correct explanation of a.
(C) a is true but r is false.
(D) a is false but r is true.

29. If a capacitor is energized by a symmetrical square wave current source, then the steady state voltage across the capacitor will be
(A) square wave
(B) triangular wave
(C) step function
(D) impulse function

30. A voltage source with an internal resistance R_S supplies power to a load R_L. The power delivered to the load varies with R_L as



31. A unit impulse to a linear network has a response R(t) and a unit step input to the same network has a response S(t). the response R(t)
(A) equals $\frac{dS}{dt}(t)$
(B) equals to the integral of S(t)
(C) is the reciprocal of S(t)
(D) has no relation with S(t)

32. Two coupled coils connected in series has an equivalent inductance of 16mH or 8mH depending on the interconnection. Then the mutual inductance M between the coils is
(A) 12 mH
(B) $8\sqrt{2}$ mH

(C) 4 mH
(D) 2 mH

33. The coupling between two magnetically coupled coils is said to be ideal if the coefficient of coupling is
(A) zero
(B) 0.5
(C) 1
(D) 2

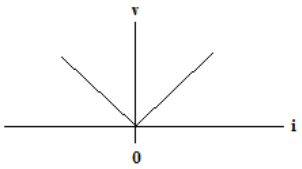
34. **List – 1 (loop concept)**
a) mesh
b) outside mesh
c) mesh current
d) number of meshes
List – 2 (junction concept)
1. Number of nodes
2. Node voltage
3. Reference node
4. Node

Match list – 1 with list – 2

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

35. An electric circuit with 10 branches and 7 nodes will have
(A) 3 loop equations
(B) 4 loop equations
(C) 7 loop equations
(D) 10 loop equations

36. The v – i characteristic of an element is shown in the figure given below. The element is



(A) non-linear, active, non-bilateral
(B) linear, active, non-bilateral
(C) non-linear, passive, non-bilateral
(D) non-linear, active, bilateral

37. In a network made up of linear resistors and ideal voltage sources, values of all resistors are doubled. Then the voltage across each resistor is
(A) doubled
(B) halved
(C) decreased four times
(D) not changed

(ANSWER KEY AT THE BOTTOM)

38. Consider the following statements:
Any element connected in
1. Series with a voltage source is redundant
2. Parallel with a voltage source is redundant
3. Series with a current source is redundant
4. Parallel with a current source is redundant
The correct statements are:
(A) 1 and 3
(B) 2 and 3
(C) 3 and 4
(D) 1 and 2

39. If an ideal voltage source and ideal current source are connected in series the combination
(A) has the same properties as a current source alone
(B) has the same properties as a voltage source alone
(C) has the same properties as the source which has a higher value
(D) results in the branch being redundant

40. A conductor of diameter d, length l consumes a power W when a current flows through it. What will be the power consumed if d is doubled and l I halved and current is tripled?
(A) 18 W
(B) 36 W
(C) 48 W
(D) none of the above

41. Which one of the following statements is correct
Ionic crystals are
(A) hard and brittle
(B) soft and elastic
(C) hard and corrosive
(D) soft and inflammable

42. Pure metals generally have
(A) high conductivity and low temperature coefficient
(B) high conductivity and high temperature coefficient
(C) low conductivity and zero temperature coefficient
(D) low conductivity and high temperature coefficient

43. List – 1 (materials)
a) Aluminium
b) Phosphor Bronze
c) Carbon
d) Nichrome
List – 2 (applications of materials)
1. Current carrying spring
2. Heating element
3. Commutator brush
4. Telephone chords and trolley wires
codes:

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

44. When temperature of a conductor is approaching zero Kelvin, the mean free path of the free electrons in the conductor is proportional to
(A) T
(B) T^3

(C) $(\frac{1}{T})^{1/3}$
(D) $(\frac{1}{T^3})$

45. List – 1 (materials)
a) dielectric material
b) ferromagnetic
c) conductors
d) superconductors
List – 2 (equation/rule)
1. Debye equation material
2. Curie weiss's law material
3. Matthiessen's rule
4. Meissner effect

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

46. Which of the following is not a conducting material?
(A) copper
(B) tungsten
(C) germanium
(D) platinum

47. Manganin, an alloy of copper and manganese, is used in
(A) soldering material
(B) heating element
(C) ballast resistor
(D) standard resistances

48. The material not having negative temperature coefficient of resistivity are
(A) metals
(B) semiconductors
(C) insulators
(D) none of the above

49. The standard resistor is a coil of wire of some alloys having the properties of
(A) low electrical resistivity and high temperature coefficient of resistance
(B) high electrical resistivity and high temperature coefficient of resistance
(C) low electrical resistivity and low temperature coefficient of resistance
(D) high electrical resistivity and low temperature coefficient of resistance

50. Consider the following statements:
In the case of diamagnetic materials, the magnetic susceptibility is
1. Positive
2. Negative
3. Independent of temperature
4. Inversely proportional to temperature
Of these statement
(A) 1 and 3 are correct
(B) 2 and 3 are correct
(C) 1 and 4 are correct
(D) 2 and 4 are correct

51. Which one of the following statements is not correct for a soft magnetic material?
(A) a soft magnetic material is used in a transformer as a core
(B) a soft magnetic material has a high value of initial permeability
(C) a soft magnetic material has high eddy current losses
(D) a soft magnetic material has low hysteresis loss

(ANSWER KEY AT THE BOTTOM)

52. Which one of the following materials cannot be used for permanent magnets?
(A) Alnico
(B) Barium ferrite
(C) Carbon steel
(D) iron – cobalt alloy

53. The hysteresis loop for the material of the core of a transformer should be
(A) short and narrow
(B) tall and narrow
(C) short and wide
(D) tall and wide

54. All magnetic materials lose their magnetic properties when
(A) cooled to low temperature
(B) heated to high temperature
(C) kept in a aluminium box
(D) kept in vacuum

55. Above the curie temperature ferro magnetic materials behaves like
(A) paramagnetic
(B) diamagnetic
(C) anti – ferromagnetic
(D) ferromagnetic

56. Magnetostriction is a phenomenon of
(A) generation of electricity in ferromagnetic materials
(B) generation of magnetism in conductors
(C) change in permeability of ferro – magnetic materials during magnetization
(D) change in physical dimensions of magnetic materials during magnetization

57. Ferrites are the materials which have
(A) low permeability and low dielectric loss
(B) low permeability and high dielectric loss
(C) low hysteresis and high eddy current loss
(D) low hysteresis and eddy current losses.

58. Which one of the following is not an electromagnetic device
(A) hall transducer
(B) transformer
(C) speedometer
(D) eddy current damping device

59. Which material is used for making permanent magnets?
(A) carbon steel
(B) germanium
(C) silicon
(D) none of the above

60. When a transition occurs to the superconducting state, the magnetic flux is excluded from the material. This is known as
(A) magnetophobic effect
(B) Silsbee effect
(C) meissner effect
(D) cooper effect

61. What type of magnetic behavior is observed in a type 1 superconductor?
(A) perfect diamagnetism
(B) perfect paramagnetism
(C) perfect ferromagnetism
(D) perfect ferrimagnetism

62. Which of the following is not true?
(A) superconductors shows perfect diamagnetism
(B) superconductors have almost zero resistivity

(ANSWER KEY AT THE BOTTOM)

(C) the external magnetic field has no effect on superconductors
(D) entropy increases from going from superconducting state to normal state

63. The transition temperature of mercury at which it becomes superconductive is
(A) 4.12° F
(B) 4.12° C
(C) 4.12° K
(D) 41.2° K

64. On which of the following factors does the value of critical current density in a superconductor depend?
(A) temperature
(B) applied magnetic field
(C) temperature and applied magnetic field
(D) silsbee's rule

65. Superconductivity is destroyed
(A) at high temperature
(B) at high magnetic field
(C) in presence of presence of magnetic impurities
(D) in all the above cases

66. Which one of the following is the correct statement?
Superconducting metal in superconducting state has relative permeability of
(A) more than one
(B) one
(C) zero
(D) negative

67. Which one of the following materials is piezoelectric?
(A) Pb_2Au
(B) $BaTiO_3$
(C) $MgAl_2O_4$
(D) $BiFe_2O_4$

68. Consider the following statements:
piezoelectric materials are useful for converting
1. Mechanical energy into electrical energy
2. Electrical energy into mechanical energy
3. Mechanical energy into chemical energy
4. Chemical energy into mechanical energy
of these statements
(A) 1 and 2 are correct
(B) 1, 2, 3 and 4 are correct
(C) 1 alone correct
(D) 2, 3 and 4 are correct

69. The most important set of specifications of transformer oil includes
(A) dielectric strength and viscosity
(B) dielectric strength and flash point
(C) flash point and viscosity
(D) dielectric strength, viscosity and flash point

70. Ferro – electric materials have a
(A) high dielectric constant which varies non linearly
(B) low dielectric constant and is non linear
(C) high dielectric constant which varies linearly
(D) low dielectric constant but linear

71. In a certain temperature range, the electrical conductivity of a semiconductor increases with increase in temperature. This is because
(A) both carrier concentration and mobility of carriers increases with increasing temperature
(B) both carrier concentration and mobility of carriers decreases with increasing temperature

(C) the carrier concentration increases substantially, but the mobility of carrier decreases with increase in temperature.
(D) the carrier concentration remains constant but the mobility of carrier increases in temperature

72. Consider the following statements:
pure germanium and pure silicon are example of
1. Direct band – gap semiconductors
2. Indirect band – gap semiconductors
3. Degenerate semiconductors
of these statements
(A) 1 alone is correct
(B) 2 alone is correct
(C) 3 alone is correct
(D) 1 and 3 are correct

73. For a semiconductor, which one of the following statements is not correct?
(A) when an electron and a hole recombine, energy must be liberated
(B) electrons in the conduction band can acquire a net acceleration from a field because there are empty energy levels available
(C) an electron in the valence band cannot be accelerated by the field unless there are empty energy levels available
(D) holes cannot be accelerated by the field unless there are empty energy levels available

74. The forbidden energy gap in silicon at 300 K is
(A) 1.41 eV
(B) 1.1 eV
(C) 0.785 eV
(D) 0.72 eV

75. With an increase in temperature, the Fermi level in an intrinsic semiconductor
(A) moves closer to the conduction band edge
(B) moves closer to the valence band edge
(C) moves into the conduction band
(D) remains at the center of the forbidden gap

76. The development of barrier potential in the depletion zone of a PN junction is a consequent to
(A) diffusion of majority carriers across junction
(B) drift of minority carriers across junction
(C) generation of minority carriers due to thermal energy
(D) initial flow of conduction current

77. The hall coefficient of an intrinsic semiconductor is
(A) positive
(B) negative
(C) zero
(D) infinite

78. Width of the energy band depends on which of the following?
(A) temperature
(B) pressure
(C) relative freedom of electrons in the crystal
(D) mass of the atom in the material

79. Which one of the following is a trivalent material?
(A) antimony
(B) phosphorous
(C) arsenic
(D) boron

80. When donor atoms are added to semiconductor, it
(A) increases the energy band gap of the semiconductor
(B) decreases the energy band gap of the semiconductor
(C) introduces a new narrow band gap near the conduction band
(D) introduces a new discrete energy level below the conduction band

(ANSWER KEY AT THE BOTTOM)

81. Moving iron instruments can be used on
(A) both ac and dc
(B) only ac
(C) only dc
(D) none of the above

82. Deflecting torque can be produced by
(A) gravity control
(B) spring control
(C) air friction
(D) magnetically

83. Moving coil instruments are
(A) permanent magnet type
(B) dynamo meter type
(C) induction type
(D) permanent magnet and dynamo meter type

84. For increasing the range of an ammeter, connect
(A) a high value resistance in series with the ammeter coil
(B) a high value resistance in parallel with the ammeter coil
(C) a low value resistance in parallel with the ammeter coil
(D) a low value resistance in series with the ammeter coil

85. A galvanometer can be used to measure current and voltage of a circuit by
(A) shunt only
(B) connecting high value of resistance in series only
(C) shunt for measuring current and high resistance in series for measuring voltage
(D) without shunt and series resistance

86. Most common used wattmeter is
(A) induction type wattmeter
(B) electrostatic type wattmeter
(C) dynamo meter type wattmeter
(D) moving iron type wattmeter

87. The energy meter used for measuring energy of a dc circuit is
(A) ampere hour meter
(B) induction type
(C) electrostatic type
(D) dynamo meter type

88. Anderson bridge is used to measure
(A) inductor (L)
(B) capacitor (C)
(C) voltage (V)
(D) current (I)

89. Hay's bridge is suitable for the measurement of
(A) inductance with $Q > 0$
(B) inductance with $Q < 0$
(C) capacitors with high dissipation factor
(D) capacitors with low dissipation factor

90. Frequency can be measured by using
(A) wein's bridge
(B) de sauty's bridge
(C) schering's bridge
(D) anderson's bridge

91. In CRO the time base signal is applied to
(A) Y – plates
(B) X – plates

(ANSWER KEY AT THE BOTTOM)

(C) either Y – plates or X – plates
(D) both Y – plates and X – plates

92. The main advantage of crystal oscillator is that its output is
(A) a constant frequency range
(B) DC
(C) 50 Hz to 60 Hz
(D) variable frequency

93. Moving iron and PMMC instruments can be distinguished from each other by looking at the
(A) pointer
(B) terminal size
(C) scale
(D) scale range

94. For measuring emf of a standard cell we use
(A) galvanometer
(B) potentiometer
(C) zener reference
(D) electro dynamic voltmeter

95. Megger is an instrument used for the measurement of
(A) high resistance and insulation resistance
(B) medium resistance
(C) low resistance
(D) leakage resistance

96. Kelvin double bridge is best suited for the measurement of
(A) inductance
(B) capacitance
(C) low resistance
(D) high resistance

97. The material used to make standard resistance is
(A) manganin
(B) aluminium
(C) nichrome
(D) platinum

98. In which part of the scale does the pointer indicates more accurately
(A) in the first third of the cycle
(B) in the first half of the cycle
(C) in about middle of the scale
(D) in the last third of the cycle

99. The ratio of maximum displacement deviation to the full scale deviation of the instrument is called?
(A) static sensitivity
(B) accuracy
(C) linearity
(D) precision

100. Anderson's bridge is a modification of
(A) maxwell's wein bridge
(B) hay's bridge
(C) schering's bridge
(D) owen's bridge

101. Heat conduction in a semiconductor takes place
(A) by the mobility of the carriers
(B) due to the energy gap between the conduction band and valence band
(C) by the holes and thermal vibrations of atoms
(D) by the electrons and thermal vibrations of atoms

(ANSWER KEY AT THE BOTTOM)

102. An intrinsic semiconductor has equal number of electrons and holes in it. This is due to
(A) doping
(B) free electrons
(C) thermal energy
(D) valence electrons

103. An electrical breakdown of a p –n junction occurs if
(A) forward voltage increases up to the rating
(B) reverse voltage increases beyond the rating
(C) forward voltage decreases below the rating
(D) reverse voltage decreases below the rating

104. The temperature coefficient of resistance of a doped semiconductor is
(A) always positive
(B) always negative
(C) zero
(D) positive or negative depending upon the level of doping

105. Behavior of conductors, semiconductors and insulators is explained on the basis of
(A) atomic structure
(B) molecular structure
(c) energy band structure
(D) all of the above

106. Velocity error constant of the system is measured when the input of the system is unit ____
(A) ramp function
(B) impulse function
(C) step function
(D) parabolic function

107. The second derivative input signal
(A) controls the time constant of the circuit
(B) suppresses oscillations
(C) modifies the damping and gain of the system
(D) both (A) and (B)

108. Transient function of the system and the response in terms of laplace transform are the same for
(A) unit impulse function
(B) ramp function
(C) unit step function
(D) parabolic function

109.A unit step function on integration results in a
(A) unit doublet
(B) unit ramp function
(C) unit parabolic function
(D) none of the above

110. The transfer function of a system is used to determine
(A) the output for a given input
(B) the type of the system
(C) the input for a given output
(D) the steady state gain

111. The transfer function has the main application in the study of ____ behavior in the system.
(A) steady
(B) transient
(C) both steady and transient
(D) none of the above

112. The ON – OFF controller is a
(A) linear system
(B) non linear system

(C) discontinuous system
(D) digital system

113. Control systems are normally designed with damping factor of
(A) less than unity
(B) more than unity
(C) zero
(D) unity

114. The transient response of a system is mainly due to
(A) friction
(B) inertia forces
(C) internal forces
(D) stored energy

115. Regenerative feedback
(A) implies feedback with positive sign
(B) is sometimes used to increase the loop gain of the feedback system
(C) has the transfer function with a negative sign in the denominator
(D) all of the above

116. In a control system the comparator compares the output response and reference input and actuates the
(A) transducer
(B) signal conditioner
(C) control element
(D) primary sensing element

117. For the equation $s^3 - 4s^2 + s + 6 = 0$ the number of roots in the left half of s-plane will be
(A) zero
(B) one
(C) two
(D) three

118. The nyquist plot of loop transfer function G(s) H(s) of a closed loop control system passes through the point (-1, j0) in the G(s) H(s) plane. The phase margin of the system is
(A) 0°
(B) 45°
(C) 90°
(D) 180°

119. Consider the function, F(s) = $\frac{5}{s(s^2+3s+2)}$ where F(s) is the laplace transform of the function f(t). The initial value of the f(t) is equal to
(A) 5
(B) 5/2
(C) 5/3
(D) 0

120. The gain margin of a unity feedback control system with the open loop transfer function $G(s) = \frac{(s+1)}{s^2}$ is
(A) 0
(B) $1/\sqrt{2}$
(C) $\sqrt{2}$
(D) ∞

121. Maxwell's divergence equation for the magnetic field is given by
(A) ∇ x B = 0
(B) ∇ . B = 0
(C) ∇ x B = ρ
(D) ∇ . B = ρ

122. The electric field lines are equipotential lines
(A) are parallel to each other

(ANSWER KEY AT THE BOTTOM)

(B) are one and the same
(C) cut each other orthogonally
(D) can be inclined to each other at any angle

123. The unit of the poynting vector is
(A) power
(B) power density
(C) energy
(D) energy density

124. Nyquist criterion is a
(A) current domain test
(B) frequency domain test
(C) voltage domain test
(D) transient domain test

125. Which one of the following is the best method for determining the stability and transient response?
(A) root locus
(B) bode plot
(C) nyquist plot
(D) none of the above

126. Which one of the following can be measured by LVDT
(A) Displacement
(B) velocity
(C) acceleration
(D) all of the above

127. The capacitance in force –current analogy, is analogous to
(A) momentum
(B) velocity
(C) displacement
(D) mass

128. In force – voltage analogy, velocity is analogous to
(A) current
(B) charge
(C) inductance
(D) capacitance

129. In a system, zero initial condition is that
(A) the system is at rest and no energy is stored in any of its components
(B) the system is working with zero stored energy
(C) the system is working with zero reference signal
(D) none of the above

130. Type 1 system has ___ at the origin
(A) no pole
(B) net pole
(C) simple pole
(D) two poles

131.A closed loop system is distinguished with an open loop system by which of the following?
(A) servomechanism
(B) feedback
(C) output pattern
(D) input pattern

132. By which of the following the control action is determined when a man walks along a straight path?
(A) brain
(B) hands

(ANSWER KEY AT THE BOTTOM)

(C) legs
(D) eyes

133.AC servomotors resembles
(A) two phase induction motor
(B) three phase induction motor
(c) direct current series motor
(D) universal motor

134. The time required for the response to rise from 10% to 90% of the final value for over damped systems and 0% to 100% of the final value for under damped systems is called the
(A) rise time
(B) pick up time
(C) settling time
(D) transient time

135. Error constants of the system are measure of
(A) relative stability
(B) transient state response
(C) steady state response
(D) steady state as well as transient state response

136. The mason's gain formula of a transfer function is given by
(A) T = $\sum_{k=0}^{k} \frac{P_k \Delta_k}{\Delta}$
(B) T = $\sum_{k=1}^{k} \frac{P_k \Delta_k}{\Delta}$
(C) T = $\sum_{k=0}^{\infty} \frac{P_k \Delta_k}{\Delta}$
(D) T = $\sum_{k=1}^{\infty} \frac{P_k \Delta_k}{\Delta}$

137. If all the elements of a row in routh's tabulation are zero and no sign change in the first column then the system is
(A) stable
(B) marginally stable
(C) unstable
(D) none of the above

138. The amount of additional phase lag required to bring the system to the point of instability is the _____of a stable system.
(A) phase margin
(B) gain margin
(C) closed margin
(D) none of the above

139. The variation of the magnitude of sinusoidal transfer function expressed in decibel and the corresponding phase angle in degrees being plotted w.r.t frequency on a logarithmic scale in rectangular axes. The plot so obtained is
(A) Root locus
(B) Gain phase plot
(C) Nichols chart
(D) Bode plot

140. The stability of the given characteristics equation is
$s^4 + 10s^3 + 30s^2 + 100s + 25 = 0$
(A) stable
(B) unstable
(C) marginally stable
(D) cannot be determined

141. The smallest set of variables which determine the state of a dynamic system are called
(A) state variable
(B) space variable
(C) vector variable
(D) state space variable

(ANSWER KEY AT THE BOTTOM)

142. "Every square matrix satisfies its own characteristics equation". The theorem is
(A) Laplace transform theorem
(B) Infinite series theorem
(C) Cayley-Hamilton theorem
(D) Diagonalization theorem

143. The angle of departure from a complex open – loop pole is given by
(A) $\Phi_d = 90° - (\Phi_p - \Phi_z)$
(B) $\Phi_d = 180° - (\Phi_p - \Phi_z)$
(C) $\Phi_d = 270° - (\Phi_p - \Phi_z)$
(D) $\Phi_d = 360° - (\Phi_p - \Phi_z)$

144. High resistances are measured by
1. Ammeter-voltmeter method
2. Direct deflection method
3. Megger method
4. Substitution method
5. Carey-foster method
(A) 1, 2, 3 and 4 are correct
(B) 2,3 and 4 are correct
(C) 2 and 3 are correct
(D) 3 and 4 are correct

145. Measurement of mutual inductance is done by
(A) Heaviside Bridge
(B) Heaviside campbel equal ratio bridge
(C) Both (A) and (B)
(D) Only (A)

146. Torque developed by a coil suspended in a magnetic field is given by
(A) T = B x A x I
(B) T = B x A x I x N
(C) T = B x A x I x N x V
(D) T = B x A x N x V

147. Which one of the following are Integrating type Instruments?
1. Analog ammeter
2. Power factor meter
3. Watt – hour meter
4. Ampere – hour meter
5. Recording voltmeter
(A) 1 and 2
(B) 2 and 3
(C) 3 and 4
(D) 1, 2, 3, 4 and 5

148. The use of _____ instruments is merely confined within laboratories as standardizing instruments.
(A) absolute
(B) indicating
(C) integrating
(D) recording

149. Which one of the following essential features is possessed by indicating instruments?
(A) deflecting
(B) controlling
(C) damping
(D) all of the above

150. Which one of the following meters are not used in d.c. circuits?
(A) mercury motor meters
(B) commutator motor meters

(ANSWER KEY AT THE BOTTOM)

(C) induction meters
(D) none of the above

151. A universal RLC bridge uses
(A) Maxwell bridge configuration for measurement of inductance and De santy bridge for measurement of capacitance
(B) Maxwell wein bridge for measurement of inductance and modified De santy bridge for measurement of capacitance
(C) Maxwell wein bridge for measurement of inductance and wein bridge for measurement of capacitance
(D) any of the above

152. If the current in a capacitor lead the voltage by 80°, the loss angle of the capacitor is
(A) 10°
(B) 80°
(C) 100°
(D) 170°

153. The two pressure coils of a single phase power factor meter have
(A) the same dimensions as the same number of turns
(B) the same dimensions but different number of turns
(C) the same number of turns but different dimensions
(D) different dimensions and different number of turns

154. Systematic errors are
(A) instrumental errors
(B) environmental errors
(C) observational errors
(D) all of the above

155. To measure radio frequency, the suitable frequency meter is
(A) Weston frequency meter
(B) Reed vibrator frequency meter
(C) Hetrodoxy frequency meter
(D) Electrical resonance frequency meter

156. Most sensitive galvanometer is
(A) elastic galvanometer
(B) vibration galvanometer
(C) duddlb galvanometer
(D) spot ballistic galvanometer

157. An HRC fuse is
(A) a ceramic body having metal and caps
(B) a wire of platinum
(C) a heavy cross-section of copper or aluminium
(D) a ceramic tube having carbon rod inside

158. Copper even though costly, finds use in the windings of electrical machines because
(A) copper points offers low contact resistance
(B) copper can be easily soldered and welded
(C) copper windings are less bulky and the machines become compact
(D) all of the above

159. Selenium is _____ semiconductor.
(A) extrinsic
(B) intrinsic
(C) n – type
(D) p – type

160. The minority carrier concentration is largely a function of
(A) forward biasing voltage
(B) reverse biasing voltage
(C) temperature
(D) the amount of doping

(ANSWER KEY AT THE BOTTOM)

161. Conductivity is analogous to
(A) retentivity
(B) resistivity
(C) permeability
(D) inductivity

162. A laminated iron core has reduced eddy current losses because
(A) more wire can be used with less dc resistance in coil
(B) the laminations are insulated from each other
(C) the magnetic flux is concentrated in the air gap of the core
(D) the core is made of silicon steel

163. The core of a coil has a length of 200 mm. the inductance of coil is 6 mH. If the core length is doubled, all quantities remaining the same, the inductance will be
(A) 3 mH
(B) 12 mH
(C) 24 mH
(D) 48 mH

164. The self inductances of two coils are 8 mH and 18 mH. If the coefficients of coupling is 0.5, the mutual inductance of the coils is
(A) 4 mH
(B) 5 mH
(C) 6 mH
(D) 12 mH

165.A 200 turn coil has an inductance of 12 mH. If the number of turns is increased to 400 turns, all other quantities (area, length etc.) remaining the same, the inductance will be
(A) 6 mH
(B) 14 mH
(C) 24 mH
(D) 48 mH

166. The peak value of a sine wave is 200 V. Its average value is
(A) 127.4 V
(B) 141.4 V
(C) 282.8 V
(D) 200 V

167. The rms value and the mean value is the same in the case of
(A) triangular wave
(B) sine wave
(C) square wave
(D) half wave rectified sine wave

168. For a frequency of 200 Hz, the time period will be
(A) 0.05 s
(B) 0.005 s
(C) 0.5 s
(D) 0.0005 s

169. Capacitors for power factor correction are rated in
(A) kW
(B) kVA
(C) kV
(D) kVAR

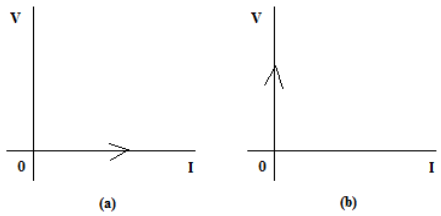
170. In a circuit containing pure R, L and C, power loss can take place in
(A) R only
(B) L only
(C) C only
(D) R, L and C

(ANSWER KEY AT THE BOTTOM)

171. A battery consists of 5 cells, each having an emf of 1.2 V and internal resistance of 0.4 Ω joined in series. If this battery supplies current to a 6 Ω resistor, what is the current supplied by the battery?
(A) 0.75 A
(B) 4.5 A
(C) 2.0 A
(D) 6 A

172. 3 resistors of value 3 Ω, 8 Ω and 24 Ω are connected in parallel across a 12 V d.c. supply. What is the total current?
(A) 4 A
(B) 1.5 A
(C) 0.5 A
(D) 6 A

173. The graphs (a) and (b) shows



(A) open circuit and short circuit respectively
(B) short circuit and open circuit respectively
(C) both open circuit
(D) both close circuit

174. If a wire conductor of 0.2 ohm resistance is doubled in length, its resistance becomes
(A) 0.4 ohm
(B) 0.6 ohm
(C) 0.8 ohm
(D) 1.0 ohm

175. If three 15 μF capacitors are connected in series, the net capacitance is
(A) 5 μF
(B) 30 μF
(C) 45 μF
(D) 50 μF

176. "The total electric flux through any closed surface surrounding charges is equal to the amount of charge enclosed".
The above statement is associated with
(A) coulomb's square law
(B) gauss law
(C) maxwell's first law
(D) maxwell's second law

177. What is the value of capacitance that must be connected in parallel with 50 pF condenser to make an equivalent capacitance of 150 pF?
(A) 50 pF
(B) 100 pF
(C) 150 pF
(D) 200 pF

178. Resistances 1 Ω, 2 Ω and 3 Ω are connected in the form of a triangle. If a cell of emf 1.5 V and negligible internal resistance is connected across 3 Ω, the current through this resistor is
(A) 0.25 A
(B) 0.5 A
(C) 1.5 A
(D) 2.5 A

(ANSWER KEY AT THE BOTTOM)

179. What percentage of the maximum power is delivered to a load if load resistance is 10 times greater than the thevenin's resistance of the source to which it is connected?
(A) 25%
(B) 45%
(C) 35%
(D) 33.06%

180. The transient response, with feedback system
(A) rises slowly
(B) rises quickly
(C) decays slowly
(D) decays quickly

181. When ac flows through an inductor, then the current
(A) leads e.m.f. by $\frac{\pi}{2}$
(B) lags e.m.f. by $\frac{\pi}{2}$
(C) is in phase with e.m.f.
(D) none of the above

182.A series combination of RLC is connected to an ac source. If the resistance is 3 ohm and the reactance is 4 ohm, what is the pf of the circuit?
(A) 1
(B) 0.6
(B) 0.8
(D) 0.5

183. A 100 ohm resistor is needed in an electric circuit to carry a current of 0.3 A. which of the following resistor would you select?
(A) 100 ohms, 1 watt
(B) 100 ohms, 5 watts
(C) 100 ohms, 7.5 watts
(D) 100 ohms, 10 watts

184. With zero initial conditions an inductor at t = ∞ will act as
(A) open circuit
(B) short circuit
(C) a source of voltage
(D) a source of current

185. An ideal diode is
(A) current controlled resistor
(B) voltage controlled resistor
(C) neither current controlled nor voltage controlled resistor
(D) non-linear-time varying resistor

186. The superposition theorem is applicable to
(A) current only
(B) voltage only
(C) both current and voltage
(D) current, voltage and power

187. In case of delta connected circuit, when one resistor is open, power will be
(A) zero
(B) reduced to 1/3
(C) reduced by 1/3
(D) unaltered

188. Which parameter is known as transmission parameter
(A) ABCD
(B) z – parameter
(C) h – parameter
(D) Y – parameter

(ANSWER KEY AT THE BOTTOM)

189. For three phase star connected
(A) line voltage = phase voltage
(B) line current = phase current
(C) line current = $\sqrt{3}$ phase current
(D) none of the above

190. While calculating R_{Th} in thevenin's theorem and norton's theorem equivalent
(A) only current sources are made dead
(B) only voltage sources are made dead
(C) all voltage and current sources are made dead
(D) all independent sources are made dead

191. Which of the following techniques are used to determine relative stability of closed loop control system?
1. Bode plot
2. Nyquist plot
3. Nichol's chart
4. Routh Huewitz criteria
(A) 1, 2 and 4
(B) 1, 3 and 4
(C) 1, 2 and 3
(D) 1, 2, 3 and 4

192. A servo – mechanism with unit step input can be categorized as
(A) type 3 system
(B) type 2 system
(C) type 1 system
(D) type 0 system

193. A stepper motor is
(A) a two phase induction motor
(B) a kind of rotation amplifier
(C) an electromagnetic transducer commonly used to convert an angular position of a shaft into an electrical system
(D) an electromechanical device which actuates a train of step angular movements in response to a train of input pulses on one to one basis.

194. In control systems
1. Nyquist criterion
2. Bode plot
3. Root locus plot
4. Routh Hermitz's criterion
Which of the following are in time domain?
(A) 1 and 2 only
(B) 3 and 4 only
(C) 1 and 3 only
(D) 2 and 4 only

195. A system is critically damped. If the gain of the system is increased, the system will behave as
(A) over damped
(B) under damped
(C) oscillatory
(D) critically damped

196. Damping is proportional to
(A) gain
(B) $\frac{1}{gain}$
(C) $\sqrt{gain}$
(D) $\frac{1}{\sqrt{gain}}$

197. The normal range of damping ratio is
(A) 0.04 to 0.1
(B) 0.4 to 1.0

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(C) 0.8 to 1.5
(D) 1.2 to 1.8

198. As compared to a potentiometer, which one of the following is high for an LVDT?
(A) resolution
(B) voltage sensitivity
(C) both (A) and (B)
(D) none of the above

199. The system response can be tested better with
(A) sinusoidal input signal
(B) unit impulse input signal
(C) ramp input signal
(D) exponentially decaying signal

200. Well –designed first order control systems have
(A) a negative time constant
(B) a small bandwidth
(C) a small negative eigen value
(D) a large negative transfer function pole

1) D	41) A	81) A	121) B	161) C
2) B	42) B	82) D	122) C	162) B
3) D	43) C	83) D	123) B	163) A
4) C	44) D	84) C	124) B	164) C
5) A	45) D	85) C	125) A	165) D
6) B	46) C	86) C	126) D	166) A
7) A	47) D	87) A	127) D	167) C
8) D	48) A	88) A	128) A	168) C
9) A	49) D	89) A	129) A	169) D
10) D	50) B	90) C	130) C	170) A
11) B	51) C	91) B	131) B	171) A
12) D	52) D	92) A	132) D	172) D
13) D	53) B	93) C	133) A	173) B
14) B	54) B	94) B	134) A	174) A
15) C	55) A	95) A	135) C	175) A
16) C	56) D	96) C	136) B	176) B
17) D	57) D	97) A	137) B	177) B
18) D	58) C	98) C	138) A	178) B
19) A	59) A	99) C	139) D	179) D
20) A	60) C	100) A	140) A	180) D
21) B	61) A	101) D	141) A	181) B
22) C	62) C	102) C	142) C	182) B
23) A	63) C	103) B	143) B	183) D
24) C	64) C	104) D	144) C	184) D
25) D	65) D	105) C	145) C	185) C
26) C	66) C	106) A	146) B	186) D
27) A	67) B	107) D	147) C	187) C
28) C	68) A	108) A	148) A	188) A
29) B	69) D	109) B	149) D	189) B
30) C	70) A	110) A	150) C	190) D
31) A	71) C	111) A	151) B	191) C
32) D	72) B	112) B	152) A	192) C
33) C	73) D	113) A	153) A	193) B
34) B	74) B	114) D	154) D	194) D
35) B	75) D	115) D	155) C	195) B
36) A	76) A	116) C	156) D	196) D
37) D	77) B	117) B	157) A	197) B
38) B	78) C	118) A	158) D	198) D
39) A	79) D	119) D	159) B	199) B
40) D	80) D	120) A	160) A	200) D

(ANSWER KEY AT THE BOTTOM)