PART–B
ELECTRICAL ENGINEERING

51. A single-phase, full-bridge diode rectifier fed from a 230V, 50Hz sinusoidal source supplies a series combination of finite resistance, R, and a very large inductance, L. The two most dominant frequency components in the source current are :

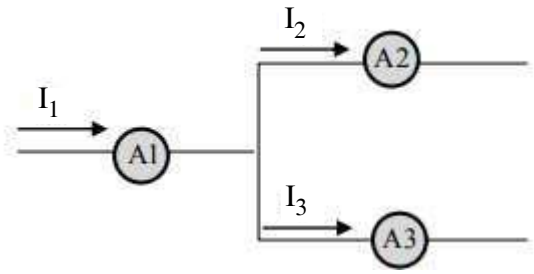
(A) 150 Hz, 250 Hz

(B) 50 Hz, 0 Hz

(C) 50 Hz, 100 Hz

(D) 50 Hz, 150 Hz

52. Currents through ammeters A2 and A3 in the figure are $1 \angle 10°$ and $1 \angle 70°$, respectively. The reading of the ammeter A1 (rounded off to 3 decimal places) is _____ A.



(A) 1.732

(B) 0.866

(C) 0.577

(D) 1.000

53. The string efficiency of a high voltage transmission line is around

(A) 100%

(B) 80%

(C) 40%

(D) 10%

54. What capacitance must be placed in series with a 15μF capacitor to give a total capacitance of 5 μF?

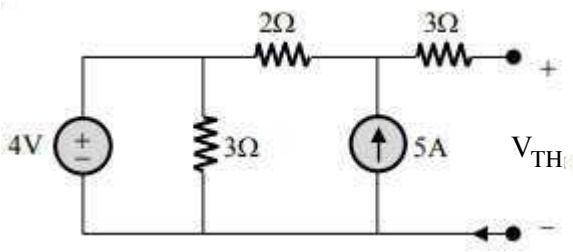
(A) 4 μF

(B) 7.5 μF

(C) 10 μF

(D) 25 μF

55. Thevenin's equivalent voltage, V_{TH} in V (rounded off two 2 decimal places) of the network shown below, is _____.



(A) 15.00

(B) 14.00

(C) 12.00

(D) 11.52

56. The inductance of a power transmission line increases with

(A) decrease in line length

(B) increase in diameter of conductor

(C) increase in spacing between the phase conductors.

(D) increase in load current carried by the conductors.

57. A loss-less transmission line with a characteristics impedance of 600 Ω is terminated in a purely resistive load of 900 Ω. The reflection co-efficient is

(A) 0.2

(B) 0.5

(C) 0.667

(D) 1.5

58. When the load resistance is equal to the internal resistance of the source the efficiency will be

(A) 100%

(B) 80%

(C) 20%

(D) None of these

59. In a 3 core cable, the capacitance between two conductors is 3 μF. What will be the capacitance per phase?

(A) 1.5 μF

(B) 3 μF

(C) 6 μF

(D) 12 μF

60. A rectifier instrument is used to measure a square-wave AC of amplitude 100 V. The meter would read _____

(A) 111 V

(B) 100 V

(C) 90 V

(D) 70.7 V

61. The ratio of readings of two wattmeter's connected to measure power in a balanced 3-phase load is 5:3 and the load is inductive. The power factor of the load is

(A) 0.917 lead

(B) 0.917 lag

(C) 0.6 lead

(D) 0.6 lag

62. Two sinusoidal quantities are said to be in phase quadrature, when

(A) there amplitude is identical

(B) there frequency is identical

(C) there wave shapes are identical

(D) there phase difference is 90°

63. In a moving iron meter the deflecting torque is proportional to

(A) square of the current through the coil

(B) current through the coil

(C) sine of the measurand

(D) square-root of the measurand

64. A 0 – 1 mA meter has a sensitivity of

(A) 1 KΩ /V

(B) 1 mA

(C) 1 KΩ

(D) 1000 A

65. Gauss theorem uses which of the following operations?

(A) Gradient

(B) Curl

(C) Divergence

(D) Laplacian

66. In a two port network, the condition for reciprocity in terms of 'h' parameters is

(A) $h_{12} = h_{21}$

(B) $h_{11} = h_{22}$

(C) $h_{11} = -h_{22}$

(D) $h_{12} = -h_{21}$

67. In force current analogy, displacement is analogous to

(A) magnetic flux linkages

(B) capacitance

(C) voltage

(D) inductance

68. The function $\frac{1}{(1+jwT)}$ has slope of

(A) –20 dB/decade

(B) 20 dB/decade

(C) 6 dB/decade

(D) –6 dB/decade

69. The polar plot of a transfer function with w as the parameter is known as

(A) Nyquist Plot

(B) Bode's Plot

(C) Root locus

(D) Signal Flow Graph

70. Superposition Theorem requires as many circuits to be solved as there are

(A) sources

(B) nodes

(C) sources + nodes

(D) sources + nodes + meshes

71. Which bridge is used to determine frequency?

(A) Anderson bridge

(B) De Sauty bridge

(C) Wien Bridge

(D) Campbell Bridge

72. Each diode of a 3-hase, 6-pulse bridge diode rectifier conducts for

(A) 60°

(B) 120°

(C) 180°

(D) 90°

73. The value of K for which the system $s^3 + 3s^2 + 3s + 1 + K = 0$ becomes stable if

(A) $K > 8$

(B) $K = 8$

(C) $K = 7$

(D) None of these

74. In a thyristor, ratio of latching current to holding current is

(A) 0.4

(B) 1.0

(C) 2.5

(D) None of these

75. An over current relay having a current setting of 125% is connected to a supply circuit through a current transformer of ratio 400/5. the pickup value is

(A) 6.25 amps

(B) 4 amps

(C) 6 amps

(D) 8 amps

76. If X is the system reactance and R its resistance, the power transferred is maximum when

(A) $X = R$

(B) $X = R\sqrt{2}$

(C) $X = R\sqrt{3}$

(D) $X = 2R$

77. The making capacity of 3-phase breaker with rating 2000 MVA, 33 KV will be :

(A) 35 KA

(B) 50 KA

(C) 70 KA

(D) 89 KA

78. The steady -state error of a stable type - 0 unity feedback system for a unit step function will be

(A) 0

(B) 1/(1+K)

(C) ∞

(D) $1/K_p$

79. A Schmitt trigger is a digital circuit that produces

(A) Rectangular output when the input is sinusoidal

(B) Sinusoidal output when the input is rectangular

(C) Square output for the trapezoidal input

(D) Rectangular output regardless of the input waveform

80. The pu impedance value of an alternator corresponding to base values of 13.2 KV and 30 MVA is 0.02 pu. The pu value for the base values 13.8 KV and 50 MVA will be

(A) 0.106 pu

(B) 0.206 pu

(C) 0.306 pu

(D) 0.318 pu

81. The connected load of a consumer is 2 KW and his maximum demand is 1.5 KW. The load factor of the consumer is :

(A) 0.75

(B) 0.375

(C) 1.33

(D) None of these

82. A four quadrant chopper cannot be operated as :

(A) one quadrant chopper

(B) cyclo converter

(C) inverter

(D) bi-directional rectifier

83. In a transformer, if the iron losses and copper losses are 40.5 KW and 50 KW respectively, then at what fraction of load will efficiency be maximum?

(A) 0.80

(B) 0.57

(C) 0.70

(D) 0.90

84. A voltmeter gives 120 oscillations per minute when connected to the rotor. The stator frequency is 50 Hz. The slip of the motor is :

(A) 2%

(B) 4%

(C) 5%

(D) 2.5%

85. The insulation resistance of a cable of length 10 Km is 1 MΩ, its resistance for 50 Km length will be :

(A) 1 MΩ

(B) 5 MΩ

(C) 0.2 MΩ

(D) None of these

86. What is the mean and standard deviation for the following data :

6, 10, 7, 13, 4, 12, 8, 12

(A) 9, 74/8

(B) 9, 47/8

(C) 8, 54/8

(D) 8, 45/8

87. The starting current of an induction motor is 5 times the full load current while the full load slip is 4%. What is the ratio of starting torque to full load torque?

(A) 0.6

(B) 0.8

(C) 1.0

(D) 1.2

88. From a set of 100 cards numbered 1 to 100, one card is drawn at random. The probability that the number obtained on the card is divisible by 6 or 8 but not by 24 is

(A) 6/25

(B) 1/4

(C) 1/6

(D) 2/5

89. The ROC of sequence

$x[n] = (0.8)^n \bigcup[n] + (0.4)^n \bigcup[n]$

(A) $|z| > 0.8$

(B) $|z| > 0.4$

(C) $0.4 < |z| < 0.8$

(D) $|z| < 0.8$

90. The impedance of a circuit is given by $Z = 3 + j4$, its conductance is given by

(A) 1/3

(B) 3/5

(C) 3/25

(D) 4/5

91. If A and B are two matrices such that AB = B and BA = A, then $A^2 + B^2$ is equal to

(A) 2AB

(B) 2BA

(C) AB

(D) A + B

92. The ripple factor from a capacitor filter _____ as the load resistance _____.

(A) decreases, decreases

(B) decreases, increases

(C) increases, decreases

(D) increases, increases

93. By placing an inverter between both inputs of S-R flip flop, the resulting flip-flop becomes

(A) JK flip-flop

(B) D flip-flop

(C) T flip-flop

(D) Master slave JK flip-flop

94. A half adder adds _____ bits and a full adder adds _____bits, producing a sum and a carry.

(A) one, two

(B) two, three

(C) two, more than three

(D) more than two, more than three

95. In a three unit insulator string, voltage across the lowest unit is 17.5 KV and the string efficiency is 84.28%. The total voltage across the string will be equal to

(A) 8.825 KV

(B) 44.25 KV

(C) 88.25 KV

(D) 442.5 KV

96. According to Gauss's law, the surface integral of the normal component of electric flux density D over a closed surface containing charge Q is

(A) Q/ε_O

(B) $\varepsilon_O Q$

(C) Q

(D) Q^2/ε_O

97. A R-S latch is

(A) combinational circuit

(B) synchronous sequential circuit

(C) one bit memory element

(D) one clock delay element

98. The value of the magnetic field at a distance x from a long straight current carrying conductor is proportional to

(A) x

(B) x^2

(C) $1/x^2$

(D) $1/x$

99. A salient pole synchronous motor is running at no load, its field current is switched off. The motor will

(A) come to a stop

(B) continue to run at synchronous speed

(C) continue to run at a speed slightly less than synchronous speed

(D) None of these

100. The effect of increasing gating angle in thyristorised rector is

(A) to increase the effective inductance of the reactor

(B) to reduce the effective reactive power

(C) Both (A) and (B)

(D) None of the above

ROUGH WORK

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Answer Key: Electrical Engg.

Q. No.	Correct Option
51.	D
52.	A
53.	B
54.	B
55.	B
56.	C
57.	A
58.	D
59.	C
60.	A
61.	B
62.	C
63.	A
64.	A
65.	C
66.	D
67.	A
68.	A
69.	A
70.	A
71.	C
72.	B
73.	D
74.	C
75.	A
76.	C
77.	D
78.	B
79.	D
80.	C
81.	D
82.	B
83.	D
84.	B
85.	C
86.	A
87.	C
88.	A
89.	A
90.	C
91.	D
92.	B
93.	B
94.	B
95.	B
96.	C
97.	C
98.	D
99.	B
100.	C