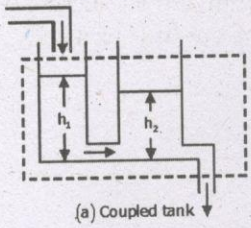
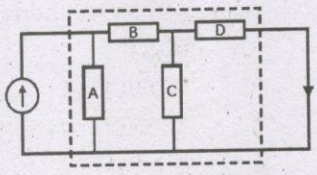
(Answer ALL questions)

56. If there are 'b' branches and 'n' nodes the number of equations will be
1. n-1
2. b
3. b-n-1
4. b-n+1

57. If the electrical circuit of figure (b) is an equivalent of the coupled tank system of figure (a), then



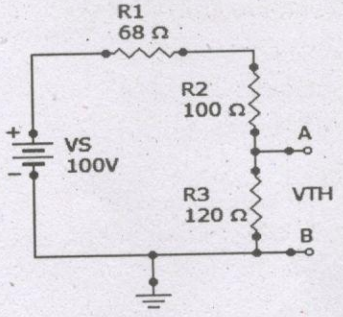
(a) Coupled tank



(b) Electrical equivalent

1. A, B are resistances and C, D capacitances
2. A, C are capacitances and B, D resistances
3. A, B are capacitances and C, D resistances
4. A, C are resistances and B, D capacitances

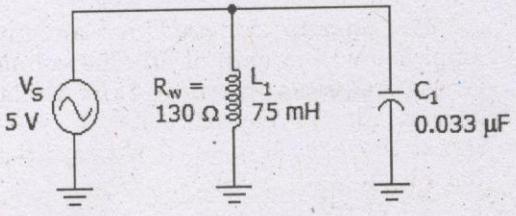
58. Find the Thevenin's equivalent (V_{TH} and R_{TH}) between terminals A and B of the circuit given below.



1. 41.6 V, 120 Ω
2. 4.16 V, 120 Ω
3. 41.6 V, 70 Ω
4. 4.16 V, 70 Ω

59. The form factor of an alternating current waveform is the ratio of the
1. r.m.s value to peak value
2. peak value to r.m.s value
3. r.m.s value to average value
4. average value to r.m.s value

60. What is the resonant frequency in the given circuit?



1. 3.2 kHz
2. 275.8 Hz
3. 11.6 Hz
4. 1.5 kHz

61. The fundamental period of the signal $x(n)=\frac{\cos\pi}{3}n+\frac{\cos 3\pi}{4}n$ is
1. 3
2. 6
3. 12
4. 24

62. ROC of a finite causal discrete time sequence is
1. Entire z-plane
2. Entire z-plane except $z=0$
3. Entire z-plane except z = infinity
4. Entire z-plane except $z=0$ and $z=$ infinity

63. DFT is
1. Sampled version of z transform
2. Discrete time Fourier transform
3. Z-transform on unit circle
4. Sampled version of discrete time Fourier transform

64. Poles of the system described by the difference equation $y(n)+3y(n-1)+2y(n-2)=x(n)+x(n-1)$ are
1. 1, 2
2. –2, –3
3. –1, –2
4. 2, 3

65. In an FIR filter, present output depends on
1. Present input
2. Present input and past inputs
3. Present input, past inputs and past outputs
4. Present and future inputs

66. RC phase shift oscillator is designed to oscillate at 100 Hz. If C = 0.1 μF
1. R = 0.649 KΩ
2. R = 6.49 KΩ
3. R = 64.9 KΩ
4. R = 649 KΩ

67. A 741 op-amp is used as an inverting amplifier with a gain of 50. The voltage gain verses frequency curve of 741C is flat upto 20kHz. The maximum peak to peak input signal that can be applied without distorting the output is
1. 139 mV
2. 149 mV
3. 159 mV
4. 169 mV

68. BJT can be used as an amplifier in
1. Cut-off region
2. Active region
3. Saturation region
4. Both cut-off and saturation region

69. BJT has ———— input impedance and MOSFET has ———— input impedance.
1. Low and low
2. Low and high
3. High and low
4. High and high

70. Precision rectifier is used to reduce the cut-in voltage of diode from 0.6 to
1. 6 mV
2. 60 mV
3. 6 μV
4. 60 μV

71. How many Flip-Flops are required for mod–16 counter?
1. 5
2. 6
3. 4
4. 3

72. The digital logic family which has minimum power dissipation is
1. TTL
2. RTL
3. DTL
4. CMOS

73. The A/D converter whose conversion time is independent of the number of bits is
1. Parallel conversion
2. Dual slope
3. Counter type
4. Successive approximation

74. MOV 45, #5FH
MOV R0, 45H
INC R0
MOV @R0, #40H
The location value of R0 and the content at that place are
1. 45H, 5FH
2. 60H, 40H
3. 40H, 60H
4. 60H, 45H

75. The memory address of the last location of a 1K byte memory chip is given as 0FBFFH what will be the address of the first location?
1. 0F817H
2. 0F800H
3. 0F818H
4. 0F801H

76. The full scale deflection of a meter is 1 mA and its internal resistance is 100 Ω. This meter is to have full deflection when 100 V is measured. What is the value of series resistor to be used?
1. 99.90 kΩ
2. 100 kΩ
3. 99.99 kΩ
4. 100 Ω

77. PMMC type instruments normally used for
1. Air friction damping
2. Fluid friction damping
3. Eddy current damping
4. None of the above

78. In the two wattmeter method of measuring power in a balance three-phase circuit, one wattmeter shows zero and the other positive maximum. The load power factor is
1. zero
2. 0.5
3. 0.866
4. 1.0

79. Schering bridge is used to measure
1. Capacitance
2. Inductance
3. Low resistance
4. Mutual inductance

80. A megger is usually
1. Moving iron type instrument
2. Electrostatic type instrument
3. Hotwire type instrument
4. Moving coil type instrument

81. In CRT, aquadag carries
1. Aqueous solution of graphite
2. Sweep voltage
3. Secondary emission electrons
4. None of the above

82. In a dual slop integrating type digital voltmeter, the first integration is carried out for 10 periods of the supply frequency of 50 Hz. If the reference voltage used is 2 V, the total conversion time for an input of 1 V is
1. 0.01 s
2. 0.05 s
3. 0.1 s
4. 1 s

83. The standardization of AC potentiometer is done by
1. Using DC standard source and d' Arsonval galvanometer
2. Using AC standard sources and transfer instruments
3. Directly using AC standard voltage sources
4. Using DC standard sources and transfer instruments

84. Identify the correct set of matches

a. Mean free path	p. Hot wire anemometer
b. Piezo electric transducer	q. Optical pyrometer
c. Heat transfer coefficient	r. Knudsen gauge
d. Intensity of radiation	s. Dynamic pressure

1. (a) → (r), (b) → (s), (c) → (p), (d) → (q)
2. (a) → (r), (b) → (s), (c) → (q), (d) → (p)
3. (a) → (s), (b) → (r), (c) → (p), (d) → (q)
4. (a) → (s), (b) → (r), (c) → (q), (d) → (p)

85. The excitation frequency of LVDT is 2 kHz. The maximum frequency of displacement should be limited to
1. 1.5 kHz
2. 200 Hz
3. 1 kHz
4. 4.0 kHz

86. A resistance potentiometer has a total resistance of 10000 Ω and is rated 4W. If the range of the potentiometer is 0 to 100mm then its sensitivity in v/mm is
1. 2.0
2. 1.0
3. 0.5
4. 1.5

87. A pirani gauge measuring vacuum pressure works on the principle of
1. Change in ionization potential
2. Variation of volume with pressure
3. Variation of viscosity with pressure
4. Change in thermal conductivity

88. A pipe line is carrying water at a pressure of $10kg/cm^2$ is running at the ground level. A pressure gauge is mounted at a height of 2 m to measure the line pressure. What will be the error in the measurement
1. 6%
2. 4%
3. 2%
4. 8%

89. Which type of RTD has a linear characteristics
1. Copper
2. Platinum
3. Nickel
4. Iron

90. The table provides the thermo-emf sensitivity of five materials with reference to platinum around 273K.

Material	Constantan	Nickel	Copper	Iron	Nichrome
Sensitivity (μVK^{-1})	–35	–25	6	18.5	25

The thermocouple pair that gives the maximum sensitivity around 273K is
1. Nichrome-Constantan
2. Platinum-Constantan
3. Copper-Nickel
4. Copper-Iron

91. Determine the flow velocity of water of density 1000 kg/m^3 at the head of the pitot tube if it produces a pressure difference of 10 KPa between the outlets
1. 7.47 m/s
2. 5.47 m/s
3. 6.47 m/s
4. 4.47 m/s

92. In a rotameter 'ρ' is the density of the float and 'ρ_f' is the density of the fluid. If the flow rate should not depend on the fluid density, then

1. $\rho = 2\rho_f$
2. $\rho_f = 2\rho$
3. $\rho = (1/2)\rho_f$
4. $\rho_f = \rho$

93. Which of the flowmeter has the lowest pressure drop for a given range of flow?

1. Orifice
2. Flow nozzle
3. Venturimeter
4. Dall tube

94. In Gas chromatography, the basis for separation of the components of the volatile material is the difference in

1. Partition coefficients
2. Conductivity
3. Molecular weight
4. Molarity

95. Which law governs the principle of ion deflection in mass spectroscopy?

1. Lorentz force law and Beer Lambert Law
2. Beer Lambert law
3. Newton's 2nd law and Lorentz Force law
4. Lorentz Force law

96. The conductivity of a liquid depends on

1. Concentration of ions
2. Temperature of ions
3. Concentration and temperature
4. Concentration, ion mobility and temperature

97. It is not possible to use a pH probe in alcoholic solutions for longer time because

1. The response time will increase
2. The glass membrane will dehydrate
3. Glass impedance will increase resulting in slow response time.
4. The stabilization time for the pH probe will increase

98. As temperature increases, pH values of base and acid ———— and ———— respectively.

1. increases & increases
2. increases, decreases
3. decreases, increases
4. decreases, decreases

99. VSB modulation is preferred in Television transmission because

1. It reduces the bandwidth requirements to half
2. It preserves the low frequency components
3. Both (1) and (2) are correct
4. (1) is correct and (2) is wrong

100. A 400W carrier is amplitude modulated with m = 0.75. The total power in AM is

1. 400 W
2. 512 W
3. 588 W
4. 650 W

101. Assertion (A) : Free space does not interfere with normal radiation and propagation of radio waves

Reason (R) : Free space has no magnetic or gravitational fields.

1. Both (A) and (R) are correct and (R) is correct explanation of (A)
2. Both (A) and (R) are correct but (R) is not correct explanation of (A)
3. (A) is correct but (R) is wrong
4. (A) is wrong but (R) is correct

102. Which of the following parameter does an optical fiber sense?

1. Temperature
2. Pressure
3. Strain
4. All of the above

103. Step index optical fibers sustains

1. Single mode of propagation
2. Multimode of propagation
3. (1) and (2)
4. Limited to 10 modes

104. Closed-loop transfer function of a unity-feedback system is given by $\frac{Y(s)}{R(s)}=\frac{1}{\tau s+1}$

Steady-state error to unit-ramp input is

1. ∞
2. τ
3. 1
4. $1/\tau$

105. The phase lag produced by transportation delay

1. is independent of frequency
2. is inversely proportional to frequency
3. increases linearly with frequency
4. decreases linearly with frequency

106. Peak overshoot of step-input response of an under damped second-order system is explicitly indicative of

1. Settling time
2. Rise time
3. Natural frequency
4. Damping ratio

107. A negative unity feedback system has open-loop transfer function $G(s) = 4/s(s+4)$. The nature of the step response is

1. Under damped
2. Over damped
3. Critically damped
4. Oscillatory

108. The transfer function of a first-order system is $T(s) = 8/s + 4$. The final steady state value of the unit step response is

1. 0.5
2. 2
3. 4
4. 8

109. A system with gain margin close to unity or a phase margin close to zero is

1. Highly stable
2. Oscillatory
3. Relatively stable
4. Unstable

110. The equation $2s^4 + s^3 + 3s^2 + 5s + 10 = 0$ has _____ roots in the left half of s–plane.

1. one
2. two
3. three
4. four

111. Electrical time-constant of an armature-controlled dc servomotor is

1. equal to mechanical time-constant
2. smaller than mechanical time-constant
3. larger than mechanical time-constant
4. not related to mechanical time-constant

112. The steady-state error of a feedback control system with an acceleration input becomes finite in a

1. Type 0 system
2. Type 1 system
3. Type 2 system
4. Type 3 system

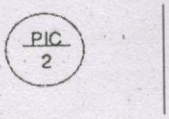
113. Which of the following terms describe a control strategy in which the output of one controller is used to manipulate the set point of another controller?

1. Ratio
2. Cascade
3. Feed-forward
4. Feed-forward plus feedback

114. In a _____ control system, the control function is allocated to several microprocessor-based control units. These control units can manipulate one or more process control loops, perform calculations and detect alarm functions. In this system no computer has all of the control responsibility.

1. DDC
2. Supervisory
3. PLC
4. DCS

115. The following P&ID symbol stands for :



1. Pressure Switch
2. Pressure Transmitter
3. Pressure controller
4. Pressure Indicating Controller