1. An inductance of one H carrying a current of two amperes will store the energy of

(A) 2 watts (B) 2 joules (C) 4 watts (D) 4 joules

---

2. The square waveform of current has following relation between r.m.s value and average value

(A) r.m.s. value of current is greater than the average value

(B) r.m.s. value of current is less than the average value

(C) r.m.s. value of current is equal to the average value

(D) There is no definite relation between the r.m.s. value and average value for a square wave

---

3. Two numbers of 500 ohms one watt resistors are connected in parallel. Their combined resistance and wattage rating will be

(A) 250 ohms, 1 watt (B) 250 ohms, 2 watts

(C) 1000 ohms, 2 watts (D) 500 ohms, 2 watts

---

4. In a long uniform coil of inductance 2L and associated resistance 2R ohms is physically cut in to two exact halves which are rewound in parallel. The resistance and inductance of the combination are

(A) R and L (B) 2R and 2L (C) R/2 and L/2 (D) R/4 and L/4

---

5. For transfer function of a physical two-port network

(A) All zeros must lie only in the left half of the s-plane

(B) All poles may lie anywhere in the s-plane

(C) The poles lying on the imaginary axis must be simple

(D) All the above

---

6. The starting torque of a three phase induction motor can be increased by

(A) Increasing rotor reactance (B) Increasing rotor resistance

(C) Increasing stator resistance (D) None of the above

---

7. The capacitor start-capacitor run single phase induction motor is operationally a

(A) Single phase motor
(B) Two phase motor
(C) Three phase motor
(D) A.C. series motor

---

8. What would happen if the field of a D.C. shunt motor is opened?

(A) Speed will be reduced
(B) Continue to run normally
(C) Speed will enormously increase damaging the motor
(D) None of the above

---

9. Equalizer rings in D.C. generator with lap windings are used for

(A) Equal distribution of current at brush for sparkless commutation
(B) Prevention of harmonics
(C) Reduction of noise and vibration
(D) Avoiding overhang

---

10. The Buchholz relay is normally used to protect the

(A) Alternators against all internal faults
(B) Oil immersed transformers against all internal faults
(C) Synchronous motors against all internal faults
(D) Transmission lines against all short circuit faults

---

11. The power transformer is a

(A) Constant current device
(B) Constant voltage device
(C) Constant power device
(D) Pulsating main flux device

---

12. A change of 5% in supply voltage to an induction motor will produce a change of approximately

(A) 5% in the rotor torque
(B) 7.5% in the rotor torque
(C) 10% in the rotor torque
(D) 25% in the rotor torque

13. If the supply frequency to the transformer is increased, the iron loss

(A) Will increase (B) Will decrease

(C) Will not change (D) May reach zero

---

14. The maximum temperature permitted for class A insulation is

(A) 180 degree centigrade (B) 105 degree centigrade

(C) 120 degree centigrade (D) None of the above

---

15. Two transformers connected in parallel share load in the ratio of their KVA ratings, provided their ohmic impedance are

(A) Equal (B) In direct ratio of their ratings

(C) In inverse ratio of their ratings (D) Purely reactive

---

16. The high frequency hum in the transformers is mainly due to

(A) Loose laminations (B) Magnetostriction

(C) Impurity in oil (D) Weakness of tank wall

---

17. A 400/200 volts transformer has pu impedance of 0.05. The HV side voltage required to circulate full load current during short circuit test is

(A) 20 V (B) 40 V (C) 10 V (D) 5 V

---

18. Non-loading heat run test on transformers is performed by means of

(A) SC test (B) OC test

(C) Core balance test (D) Sumpner's test

---

19. A three phase induction motor is driving full-load torque which is independent of speed. If the line voltage drops to 90% of the rated value, % increase in motor copper losses

(A) 23% (B) –18% (C) 123% (D) None of these

20. A synchronous generator is feeding power to infinite bus bars at unity power factor. Its excitation is now increased. It will feed

(A) The same power but at a leading power factor

(B) The same power but at a lagging power factor

(C) More power at unity power factor

(D) Less power at unity power factor

---

21. The steam input in to a turbogenerator connected to infinite bus is increased. Which of the events will take place?

(A) The generator will feed more leading KVAR to bus bar and power angle will not change

(B) The generator will feed more real power to bus bar and power angle will increase

(C) The generator will feed more power to bus bar and power angle will decrease

(D) The generator will feed more lagging KVAR to bus bar and power angle will not change

---

22. In an ideal transformer, which of the following statement is correct?

(A) no voltage drops in resistance or leakage reactance

(B) mmf required to maintain main flux is small

(C) no core loss

(D) all the above are correct

---

23. The voltage applied to a transformer primary is increased keeping v/f fixed. How will core loss and magnetizing current change?

(A) Core loss will increase and magnetizing current remain same

(B) Core loss will remain same and magnetizing current will remain same

(C) Core loss will decrease and magnetizing current will increase

(D) Core loss will remain same and magnetizing current will decrease

---

24. Frequencies in the UHF range normally propagate by means of

(A) Ground waves (B) Sky waves

(C) Surface waves (D) Space waves

25. Indicate the antenna that is not wideband

(A) Discone (B) Folded dipole

(C) Helical (D) Marconi

---

26. The depth of penetration of a wave in a lossy dielectric increases with increasing

(A) Conductivity (B) Permeability

(C) Wavelength (D) Permittivity

---

27. Copper behaves as a

(A) Conductor always

(B) Conductor or dielectric depending on field strength

(C) Conductor or dielectric depending on frequency

(D) Conductor or dielectric depending on the electric current density

---

28. Assuming constant transmission efficiency, if voltage is increased 'n' times, the size of the conductor would be

(A) Reduced to $1/n^2$ that of the original (B) Increased to n^2 that of the original

(C) Reduced to $1/n$ that of the original (D) Increased to n times that of the original

---

29. Shunt conductance in overhead power transmission lines is primarily due to

(A) Leakage over the insulators (B) Leakage over the conductors

(C) Leakage over the poles (D) Leakage between ground and conductors

---

30. The dielectric strength of SF6 gas (used in circuit breakers) is approximately

(A) Same as that of air (B) 2 to 3 times more than air

(C) 10 to 20 times more than air (D) 2 to 3 times less than air

---

31. Ferranti effect states that under certain conditions, the sending end voltage is

(A) Less than receiving end voltage

(B) Greater than receiving end voltage

(C) Equal to receiving end voltage

(D) Not having any impact on the receiving end voltage

---

32. The equal area criterion of stability is applicable to

(A) Two machine system and infinite bus bars

(B) One machine system and infinite bus bars

(C) Multi-machine system only

(D) None of the above

---

33. The power transmission capacity of the transmission line is

(A) Inversely proportional to the square of the voltage

(B) Proportional to the voltage

(C) Inversely proportional to the voltage

(D) Proportional to the square of the operating voltage

---

34. If the torque angle 'delta' increases indefinitely, the system indicates

(A) Steady state stability

(B) Permanent stability

(C) Instability

(D) None of the above

---

35. Resistance switching is normally employed in

(A) All breakers

(B) Bulk oil breaker

(C) Minimum oil breaker

(D) Air-blast circuit breaker

---

36. Series capacitors are used to

(A) Improve line frequency and eliminate harmonics

(B) Compensate for line inductive reactance

(C) Neutralise line capacitive reactance

(D) None of the above

---

37. Over fluxing protection is normally recommended for

(A) Generator transformers in power stations

(B) Auto-transformers in power stations

(C) Station transformers in power stations

(D) Distribution transformers

---

38. In general AC distribution systems, arc interruption in vacuum circuit breakers are designed to function in a time period of

(A) One cycle

(B) Two to three cycles

(C) Within ten cycles

(D) None of the above

---

39. Systems for Protection from negative sequence current is provided normally for

(A) Transformers

(B) Generators

(C) Transmission lines

(D) Motors

---

40. Bundled conductors are mainly used in high voltage overhead transmission lines to

(A) Reduce line loss

(B) Reduce harmonics

(C) Reduce corona

(D) Increase strength

---

41. Surge impedance of overhead transmission line is normally in the order of

(A) 1 – 5 ohms

(B) 20 – 30 ohms

(C) 300 – 500 ohms

(D) 300000 – 500000 ohms

42. The bode diagram approach is applied to

(A) Non-minimum phase network
(B) Minimum phase network
(C) Any network of a control system
(D) None of the above

---

43. Which of the following methods is the strongest tool to determine the stability and the transient response of the system?

(A) Routh-Hurwitz criterion
(B) Bode plot
(C) Nyquist plot
(D) Root locus

---

44. If the gain of a critically damped system is increased, it will become

(A) Under damped system
(B) Over damped system
(C) Oscillatory system
(D) Critically damped system

---

45. The frequency domain and time domain are related through

(A) Laplace transform
(B) Gauss elimination
(C) Both (A) and (B)
(D) None of the above

---

46. A system with characteristic equation $s^2 + 2s^3 + 11s^2 + 18s + 18 = 0$ will have closed loop poles such that

(A) All poles lie in the left half of the s-plane
(B) All poles lie in the right half of the s-plane
(C) Two poles lie symmetrically on the imaginary axis of the s-plane.
(D) No pole lies on the imaginary axis of the s-plane.

---

47. If the gain of an open loop system is doubled, the gain margin

(A) Is not affected
(B) Gets double
(C) Becomes half
(D) Becomes one-fourth

---

48. An all pass network imparts only

(A) Negative phase to the input

(B) Positive phase to the input

(C) +/–90 degree phase shift to the input

(D) +/–180 degree phase shift to the input

---

49. An ON-OFF controller is

(A) P controller (B) Integral controller

(C) Non-linear controller (D) PID controller

---

50. The transfer function of a phase lead controller is (1 + 3Ts) / (1 + Ts). The maximum value of phase provided by this controller is

(A) 90 (B) 60 (C) 45 (D) 30

---

51. The thermal time constant is the time

(A) To reach the final steady temperature if the initial rate of increase of temperature were maintained constant

(B) To reach 63% of final steady temperature

(C) To reach 66.66% of final steady temperature

(D) To reach half of the final steady temperature

---

52. Which of the following circuit will have no transients?

(A) Pure resistive circuit (B) L-C Circuit

(C) R-L-C Circuit (D) R-L Circuit

---

53. A conductor of length 100 cm moves right angles to a magnetic field of flux density of 2 wb/sq.m. with the velocity of 25 m/second. The induced emf in the conductor will be

(A) 25 volts (B) 50 volts (C) 75 volts (D) 100 volts

54. Which of the following devices are required to measure three phase balanced power?

(A) One watt meter

(B) One watt meter and one voltage transformer of 1 : 1 ratio

(C) One watt meter and two voltmeters

(D) None of the above

---

55. The sensitivity of an instrument is

(A) The smallest increment in the input that can be detected with certainty

(B) The largest input change to which the instrument fails to respond

(C) Ratio of the change in the magnitude of the output to the corresponding change in the magnitude of the input

(D) Closeness of the output values for repeated application of a constant input

---

56. Potentiometer sensitivity can be increased by

(A) Decreasing current in the potentiometer wire

(B) Increasing the length of the potentiometer wire

(C) Decreasing the length of the potentiometer wire

(D) Replacing the cell by a regulated power supply

---

57. Low resistance is measured with

(A) De Sauty's bridge

(B) Maxwell's bridge

(C) Kelvin's double bridge

(D) Wien bridge

---

58. Which bridge is used to determine frequency?

(A) Anderson bridge

(B) De Sauty bridge

(C) Wien bridge

(D) Campbell's bridge

---

59. The core of a moving iron instrument is made up of permalloy to

(A) Increase sensitivity
(B) Reduce temperature effect
(C) Reduce effect of stray magnetic field
(D) Reduce the size of the instrument

---

60. Accuracy is defined as

(A) The measure of consistency of the readings
(B) Closeness with which an instrument reading approaches the true value of the quantity being measured
(C) The smallest measurable input change
(D) The ratio of the input to output

---

61. If three amplifiers having the same bandwidth are cascaded, the bandwidth of the resulting amplifier will be

(A) Better than that of each stage
(B) Worse than that of each stage
(C) Same as that of each stage
(D) None of the above

---

62. An element is said to have negative resistance when

(A) The element has negative temperature coefficient
(B) The current / voltage curve has negative slope
(C) The element has negative specific resistance
(D) The current / voltage curve has a positive slope

---

63. The operational amplifiers are seldom used for differentiation because

(A) Of the problem of drift with differentiating circuits
(B) Because of the poor efficiency
(C) Because of the complex circuitry requirements
(D) The noises are amplified and this can be significant in the output.

---

64. Which of the following multivibrator is called the flip flop?

(A) Astable multivibrator
(B) Monostable multivibrator
(C) Bistable multivibrator
(D) Both (B) and (C)

---

65. The amount of feedback applied to an amplifier reduces the gain by a factor of 10. The bandwidth

(A) Decreases by factor of 10
(B) Increases by a factor of 10
(C) Remains the same
(D) None of the above

---

66. In a negative feedback amplifier, the output impedance is decreased

(A) If the signal sampled is a voltage
(B) If the signal sampled is a current
(C) If the feedback signal is a voltage
(D) If the feedback signal is a current

---

67. The ROM consists of

(A) A decoder followed by an encoder
(B) An encoder followed by a decoder
(C) A multiplexer followed by a decoder
(D) A multivibrator

---

68. An ideal rectifier should have transformer utilization factor (TUF) of 1. If the actual TUF is 3.5, it shows that

(A) Diode is under-loaded
(B) The transformer must be 3.5 times larger
(C) The transformer should be only 1/3.5 times the ideal size
(D) The ripple factor is low

---

69. A power MOSFET is a

(A) Voltage controlled device
(B) Current controlled device
(C) Frequency controlled device
(D) None of the above

70. When transistors are used in series or parallel, a snubber circuit is used to

(A) Control the current (B) Control the voltage

(C) Limit di / dt (D) All of these

---

71. $\lim_{x\to\infty}\left(\frac{x+\sin x}{x}\right)$ equals to

(A) $-\infty$ (B) 0 (C) 1 (D) ∞

---

72. A fair (unbiased) coin was tossed four times in succession and resulted in the following outcomes: (i) Head (ii) Head (iii) Head (iv) Head. The probability of getting a 'Tail' when the coin is tossed again is

(A) 0 (B) 1/2 (C) 4/5 (D) 1/5

---

73. What are the eigen values of the following 2 × 2 matrix $\begin{bmatrix} 2 & -1 \\ -4 & 5 \end{bmatrix}$?

(A) –1 and 1 (B) 1 and 6 (C) 2 and 5 (D) 4 and –1

---

74. $\int_0^{\frac{\pi}{2}}\int_0^{\frac{\pi}{2}} \sin(x+y)\,dx\,dy$ is

(A) 0 (B) π (C) $\frac{\pi}{2}$ (D) 2

---

75. In the Taylor series expansion of $e^x + \sin x$ about the point $x = \pi$, the coefficient

(A) e^{π} (B) $0.5\,e^{\pi}$ (C) $e^{\pi+1}$ (D) $e^{\pi-1}$

---

76. A deck of five cards (each carrying a distinct number from 1 to 5) is shuffled thoroughly. Two cards are then removed from the deck, one at a time. What is the probability that the two cards are selected with the number of the first card being one higher than the number on the second card?

(A) $\frac{1}{5}$ (B) $\frac{4}{25}$ (C) $\frac{1}{4}$ (D) $\frac{2}{5}$

---

77. Using trapezoidal rule for the table given below $\int_{4}^{5.2} \ell n\, x\, dx$ will be

x:	4	4.2	4.4	4.6	4.8	5.0	5.2
Ln x:	1.39	1.44	1.48	1.53	1.57	1.61	1.65

(A) 1.8277 (B) 1.9284 (C) 1.6424 (D) 0.98795

---

78. Find the z transform of $(n+1)^2$

(A) $\frac{z^2(2z+1)}{(z-1)^3}$ (B) $\frac{(2z+1)}{(z-1)^3}$ (C) $\frac{2+z}{(z-1)^2}$ (D) $\frac{(3z+2)}{z-1}$

---

79. Consider the following system of equations in three real variables x_1, x_2 and x_3

$2x_1 - x_2 + 3x_3 = 1$

$3x_1 - 2x_2 + 5x_3 = 2$

$-x_1 - 4x_2 + x_3 = 3$

The system of equations has:

(A) No solutions

(B) A unique solution

(C) More than one but a finite number of solutions

(D) An infinite number of solutions

---

80. Which of the following functions would have only odd powers of x in its Taylor series expansion about the point x= 0?

(A) $\sin(x^3)$ (B) $\sin(x^2)$ (C) $\cos(x^3)$ (D) $\cos(x^2)$