

M.E. Electrical Engg. (Power System)

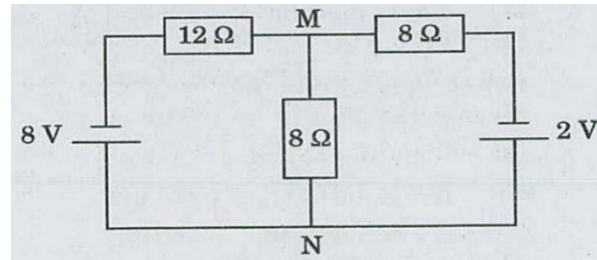
1. Which of the following meters has a linear scale?
 - A) Thermocouple meter
 - B) Moving iron meter
 - C) Hot wire meter
 - D) Moving coil meter
2. The full scale deflection current of an ammeter is 1 mA and its internal resistance is $100\ \Omega$. This is to have full deflection when 100 V is measured. What is the value of series resistor to be used?
 - A) $99.99\ \text{K}\Omega$
 - B) $100\ \text{K}\Omega$
 - C) $99.99\ \Omega$
 - D) $100\ \Omega$
3. In the case of power measurement by two wattmeters method in a balanced three phase system with a pure inductive load-.....
 - A) Both the Wattmeter will indicate the same but of opposite sign.
 - B) Both the Wattmeter will indicate zero.
 - C) Both the Wattmeter will indicate same value and of the same sign.
 - D) One Wattmeter will indicate zero and the other non-zero value.
4. Strain gauge is a passive transducer and is used for converting mechanical displacement into a change in-
 - A) Temperature
 - B) Resistance
 - C) Inductance
 - D) Capacitance
5. For an instrument the degree of repeatability in measurements is an alternative way of expressing its-
 - A) Precision
 - B) Accuracy
 - C) Sensitivity
 - D) Linearity
6. The pressure coil of a Dynamo type wattmeter is-
 - A) Highly inductive
 - B) Highly resistive
 - C) Purely resistive
 - D) Purely inductive
7. Consider the following statement
 - (i) The compensating coil of a low power factor wattmeter compensates the effect of the impedance of the current coil.
 - (ii) The compensating coil of a low power factor wattmeter compensates the effect of the impedance of the voltage coil circuit.
 - A) (i) is true but (ii) is false

- B) (i) is false but (ii) is true
 - C) Both (i) and (ii) are true
 - D) Both (i) and (ii) are false
8. Which of the following represents the current gain of a common collector configuration?
- A) α
 - B) β
 - C) $(1+\beta)$
 - D) $\beta/(1 + \beta)$
9. An Average-reading digital multimeter reads 10 V when fed with a triangular wave, symmetric about time-axis. For the same input an RMS-reading meter will read-
- A) $20/\sqrt{3}$
 - B) $20\sqrt{3}$
 - C) $10/\sqrt{3}$
 - D) $10\sqrt{3}$
10. The reverse current in a diode is of the order of-
- A) kA
 - B) mA
 - C) μA
 - D) A
11. An ideal OP-AMP is an ideal-
- A) Current controlled Current source
 - B) Current controlled Voltage source
 - C) Voltage controlled Voltage Source
 - D) Voltage controlled Current source
12. The purpose of an Attenuator is to-
- A) Increase signal strength
 - B) Provide impedance matching
 - C) Decrease reflections
 - D) Decrease value of signal strength
13. The upper 128 bytes of an internal data memory from 80H through FFH usually represent.....
- A) General purpose registers
 - B) Special function registers
 - C) Stack pointer
 - D) Program counters
14. Which location specify the storage/loading of vector address during the interrupt generation?
- A) Stack Pointer
 - B) Program Counter
 - C) Data Pointer

- D) All of the above
15. The instruction, MOV AX, 1234H is an example of which addressing mode-
- A) Register
 - B) Immediate
 - C) Direct
 - D) Based indexed
16. Which of the following form of Angle modulation in this?
If $e = 10\sin(10^8 t + 3 \sin 10^4 t)$
- A) AM
 - B) FM
 - C) AM or FM
 - D) AM or PCM
17. 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) Decreases four times
 - D) Not changed
18. Two networks are said to be dual when
- A) Their node equations are the same
 - B) The loop equations of one network are analogous to the node equations of the other
 - C) Their loop equations are the same
 - D) The voltage sources of one networks are the current sources of the other
19. A voltage source having an internal impedance of $8+j6 \Omega$ supplies power to resistive load. What should be the load resistance for maximum power transferred to it?
- A) 8Ω
 - B) 6Ω
 - C) 10Ω
 - D) 0Ω
20. If a voltmeter is connected like an ammeter in series with a load
- A) The measurement reading will be too high
 - B) Almost no current will flow in the circuit
 - C) The meter will burn out
 - D) An inadmissibly high current will flow
21. The self-inductances of two coils are 8 mH and 18 mH. If the co-efficient of coupling is $k=0.5$, the mutual inductance of the coils is

- A) 4 mH
- B) 5 mH
- C) 6 mH
- D) 12 mH

22. What is the current through the 8Ω resistance connected across the terminals, M and N in the circuit?



- A) 0.34 A from M to N
- B) 0.29 A from M to N
- C) 0.29 A from N to M
- D) 0.34 A from N to M

23. Two resistors 5Ω and 10Ω and an inductor L are connected in series across a $50\cos(\omega t)$ voltage source. If the power consumed by the 5Ω resistor is 10W, the power factor of the circuit is

- A) 1.0
- B) 0.8
- C) 0.6
- D) 0.4

24. Consider the following statements:

- Skewing of rotors slots in a 3-phase induction motor (cage rotor) may
1. introduce additional leakage reactance
 2. eliminate slot harmonics

Which of the statements given above is/are correct?

- A) Both 1 and 2
- B) 1 only
- C) 2 only
- D) Neither 1 nor 2

25. A delta/star transformer has a phase to phase voltage transformation ratio of K (where $K = \text{delta phase voltage} / \text{star phase voltage}$). The line to line voltage ratio of star/ delta connection is given by

- A) $K/\sqrt{3}$
- B) K
- C) $K\sqrt{3}$
- D) $\sqrt{3}/K$

26. In an auto transformer, power is transferred through,

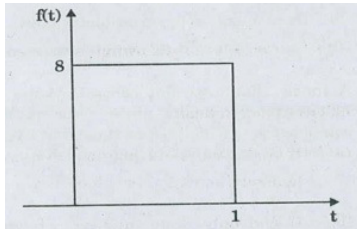
- A) Conduction process only

- B) Induction process only
 - C) Both conduction and induction processes
 - D) Mutual coupling
27. The direction of rotation of a dc series motor can be reversed
- A) By interchanging supply terminals
 - B) By interchanging supply terminals
 - C) Either by interchanging supply terminals or by interchanging field terminals
 - D) By interchanging supply terminals as well as field terminals
28. A dc shunt generator is supplying load of 1.8kW at 200 V. Its armature and field resistances are 0.4Ω and 200Ω respectively. What is the generated emf?
- A) 190V
 - B) 196V
 - C) 204V
 - D) 210V
29. The power factor of a synchronous motor
- A) Improves with increase in excitation and may even become leading at high excitations
 - B) Decreases with increase in excitation
 - C) Is independent of its excitation
 - D) Increases with loading for a given excitation
30. A starting torque of 80 Nm is developed in an induction motor by an auto-transformer starter with a tapping of 30%. If the tapping of auto-transformer starter is 60%, then what is the starting torque?
- A) 40 Nm
 - B) 160 Nm
 - C) 240 Nm
 - D) 320 Nm
31. In an induction motor what is the ratio of copper loss and rotor input?
- A) $1/s$
 - B) s
 - C) $(1-s)$
 - D) $s/(1-s)$
32. Consider the following statements:
The speed of a dc motor can be controlled by the variation of
1. Armature voltage
 2. Field current
 3. Armature circuit resistance
 4. Angle of brush shift
- Which of these statements are correct?
- A) 1,2, and 3
 - B) 2,3, and 4

- C) 1,3 and 4
D) 1,2 and 4
33. If P_1 and P_2 be the iron losses and copper losses of a transformer at full load, and the maximum efficiency of the transformer is at 75% of the full load, then what is the ratio of P_1 and P_2 ?
A) 9/16
B) 10/16
C) 3/4
D) 3/16
34. The snubber circuit is used in thyristor circuits for
A) Triggering
B) dv/dt protection
C) di/dt protection
D) Phase shifting
35. In a three phase full wave ac to dc converter, the ratio of output ripple frequency to the supply voltage frequency is
A) 2
B) 3
C) 6
D) 12
36. In a single phase semi-converter with discontinuous condition and extinction angle $\beta < \pi$, freewheeling action takes place for
A) α
B) $\alpha - \beta$
C) $\beta - \pi$
D) Zero degree
37. A converter which can operate both in 3-pulse and 6-pulse modes is a
A) 1-phase converter
B) 3-phase half wave converter
C) 3-phase semi-converter
D) 3-phase full converter
38. What is the waveform of the current flowing through the diode in a buck boost converter?
A) Square wave
B) Triangular wave
C) Trapezoidal wave
D) Sinusoidal wave
39. For a step up dc-dc chopper with an input dc voltage of 220 volts, if the output voltage required is 330 volts and the non-conducting time of thyristor-chopper is $100\mu s$, the ON time of thyristor-chopper would be
A) $66.6\mu s$
B) $100\mu s$

- C) $150\mu\text{s}$
- D) $200\mu\text{s}$

40. For a band pass signal extends from 1 KHz to 2 KHz. Then the minimum sampling frequency that needed to retain all information of the sampled signal is
- A) 1 KHz
 - B) 2 KHz
 - C) 3 KHz
 - D) 4 KHz
41. A 500 MVA, 50 Hz, 3 phase turbo generator produces power at 22 kV. Generator is Y-connected and its neutral is solidly grounded. Its sequence reactances are $X_1=X_2=0.15$ and $X_0=0.05$ p.u. It is operating at rated voltage and disconnected from rest of the system. The magnitude of the sub-transient line current for single line to ground fault at the generator terminal in pu will be
- A) 2.851
 - B) 6.667
 - C) 8.553
 - D) 3.548
42. The Laplace transform of the below function is:

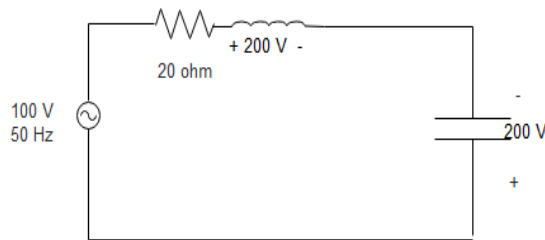


- A) $F(s) = 8s(1 - \exp^{-5})$
 - B) $F(s) = (8/s)(1 + \exp^{-s})$
 - C) $F(s) = 8s(1 + \exp^{-5})$
 - D) $F(s) = (8/s)(1 - \exp^{-s})$
43. Which one of the following describes correctly the effect of adding a zero to the system?
- A) System becomes oscillatory
 - B) Root locus shifts towards imaginary axis
 - C) Relative stability of the system increases
 - D) Operating range of K for stable operation decreases
44. What is the initial slope of Bode magnitude plot of a type-2 system?
- A) -20 db/decade
 - B) +20 db/decade
 - C) +40 db/decade
 - D) -40 db/decade
45. For a second-order differential equation, if the damping ratio ξ is unity, then
- A) Then poles are imaginary and complex conjugate

- B) The poles are in the right half of s plane
- C) The poles are equal, negative and real
- D) Both the poles are unequal, negative and real

46. The natural frequency of an undamped second-order system is 40 rad/s. If the system is damped with a damping ratio 0.3, the damped natural frequency in rad/s is
- A) 20 rad/sec
 - B) 30 rad/sec
 - C) 35.5 rad/sec
 - D) 38.15 rad/sec

47. The current in the RLC circuit shown is



- A) 5A
 - B) 10 A
 - C) 15 A
 - D) 25 A
48. The characteristic equation of a control system is given by $s(s + 4)(s^2 + 2s + 1) + k(s + 1) = 0$
What are the angles of the asymptotes for the root loci of $k \geq 0$?
- A) $60^\circ, 180^\circ, 300^\circ$
 - B) $0^\circ, 180^\circ, 300^\circ$
 - C) $120^\circ, 180^\circ, 240^\circ$
 - D) $0^\circ, 120^\circ, 240^\circ$
49. The direction of the net encirclements of the origin of Real-Imaginary plane in a Nyquist plot for the system to be stable is
- A) Clockwise of the origin
 - B) Counter-Clockwise of the origin
 - C) Left hand side s-plane
 - D) Right hand side s-plane
50. The lag system of a 'lag-lead compensator' has one pole and one zero. Then pole and zero are
- A) Real and pole is to the left of zero
 - B) Real and pole is to the right of zero
 - C) Imaginary and pole is above zero
 - D) Imaginary and pole is below zero

51. A system with characteristic equation $F(s) = S^4 + 6s^3 + 23s^2 + 40s + 50$ will have closed loop poles such that
- A) All poles lie in the left half of the s-plane and no pole lies on imaginary axis
 - B) Two poles lie symmetrically on the imaginary axis of the s-plane
 - C) All four poles lie on the imaginary axis of the s-plane
 - D) All four poles lie in the right half of the s-plane
52. Which of the following is a binary equivalent of 5_8 ?
- A) 001
 - B) 011
 - C) 101
 - D) 111
53. In a combinational logic circuit, which of the following is not correct?
- A) Input is a Boolean function
 - B) The output is fixed for a given input
 - C) Output is dependent on inputs and previous outputs
 - D) All of these
54. In NOR-NOR configuration, the minimum number of NOR gates needed to implement the switching function $X + XY' + XY'Z$ is
- A) 5
 - B) 3
 - C) 2
 - D) 0
55. On a master-slave flip-flop, when is the master enabled?
- A) When the gate is LOW
 - B) When the gate is HIGH
 - C) Both of the above
 - D) Neither of the above
56. A cascaded arrangement of flip-flops where the output of one flip-flop drives the clock input of the following flip-flop, is known as
- A) Synchronous counter
 - B) Ripple counter
 - C) Ring counter
 - D) Up counter
57. The number of flip-flops required to construct an 8-bit shift register will be
- A) 32
 - B) 16
 - C) 8
 - D) 4
58. Which of the following satisfies the condition for a critically damped RLC series circuit?
- A) $0 < \left(\frac{R}{2L}\right) < \frac{1}{\sqrt{LC}}$
 - B) $\left(\frac{R}{2L}\right) > \frac{1}{\sqrt{LC}}$

- C) $\left(\frac{R}{2L}\right) = \frac{1}{\sqrt{LC}}$
 D) None of these
59. When a delta connected network, with all its branches having an equal resistance, is converted into an equivalent star connected network, the magnitude of the resistance of each branch is
 A) Equal to the branch resistance in delta
 B) Greater than the branch resistance in delta
 C) Less than the branch resistance in delta
 D) None of these
60. The form factor of an alternating quantity is given by
 A) $\frac{\text{average value}}{\text{rms value}}$
 B) $\frac{\text{average value}}{\text{maximum value}}$
 C) $\frac{\text{rms value}}{\text{average value}}$
 D) $\frac{\text{rms value}}{\text{maximum value}}$
61. To which of the following circuits, the two wattmeter method is not suitable to measure power in a three phase circuit?
 A) Unbalanced star connected loads with neutral inaccessible
 B) Balanced star or delta connected loads
 C) Unbalanced delta connected loads
 D) None of these
62. Which of the following theorems help in simplifying computations when the load across a circuit is varying?
 A) Superposition
 B) Norton's
 C) Thevenin's
 D) Maximum power transfer
63. Reactive power in a circuit signifies
 A) Energy consumed by the magnetic/electric field
 B) Energy consumed by the resistance of the inductance/capacitance
 C) Energy exchanged between the magnetic/electric field and the source
 D) Energy consumed by the resistance in the circuit
64. When a pure LC parallel circuit is in resonance, the circuit condition can be represented by
 A) A short circuit
 B) An open circuit
 C) A normal parallel circuit
 D) None of these
65. A network delivers maximum power to the load resistance when it is
 A) Greater than Norton's equivalent resistance of the network
 B) Equal to Thevenin's equivalent resistance of the network
 C) Less than source resistance

D) Less than Norton's equivalent resistance of the network

66. The impedance of a parallel circuit is $(10 + j30 - \Omega)$ at 1 MHz. The values of circuit elements will be
A) 10 and 6.4 mH
B) 100 and 4.7 nF
C) 10 and 4.7 mH
D) 100 and 6.4 nF
67. As the frequency is increased, the skin effect
A) Decreases
B) Increases
C) Remains the same
D) Any of the above
68. The corona loss in a 50 Hz system is 0.2 Kw per phase per Km. At a frequency of 60 Hz the corona loss would be
A) 0.17 kW/phase/km
B) 0.3 kW/phase/km
C) 0.22 kW/phase/km
D) 0.24 kW/phase/km
69. The insulation resistance of a 2 km long cable is 150 M Ω . For a length of 20 km, the insulation resistance will be
A) 15 M Ω
B) 1500 M Ω
C) 300 M Ω
D) 150 M Ω
70. An Acceleration factor is used in load flow studies by
A) G-S method
B) NR method
C) De-coupled method
D) All the above
71. The inertia constant H of a turbo generator of 200 MVA is 6. The value of H corresponding to a base of 300 MVA will be
A) 9
B) 4
C) 6
D) 13.5
72. The regulation of a line at full load 0.8 power factor lagging is 11%. The regulation at full load 0.8 power factor leading can be
A) About 20 %
B) About 15 %
C) About 3 %
D) About 30 %

73. In actual practice the string efficiency is improved by using
- A) Capacitance grading
 - B) Guarding ring
 - C) Discs of different sizes
 - D) Any of the above
74. Which one of the following is used for communication with the aim of achieving high figure of merit in HVDC circuit breakers?
- A) Oil interrupter
 - B) Air interrupter
 - C) Vacuum interrupter
 - D) SF6 interrupted
75. The maximum demand on a steam power station is 480 MW. If the annual load factor is 40%, then the total energy generated annually is
- A) 19819.2×10^5 kWh
 - B) 18819.2×10^5 kWh
 - C) 17819.2×10^5 kWh
 - D) 16819.2×10^5 kWh

x-x-x