

1. The energy stored in the magnetic field in a solenoid of length 30cm and diameter 3cm wound with 1000 turns of wire & carrying a current of 10A is
 - a) 0.015 joules.
 - b) 0.15 joules.
 - c) 0.5 joules.
 - d) 1.15 joules

2. A network is said to be linear, if and only if
 - a) The response is proportional to the excitation function.
 - b) The principle of superposition applies.
 - c) The principle of homogeneity applies.
 - d) The principles of superposition and homogeneity apply.

3. Kirchoff's law fails in the case of
 - a) Non-linear networks.
 - b) Linear networks.
 - c) Dual networks.
 - d) Distributed parameter networks

4. In a four branch parallel circuit, 50mA current flows in each branch. If one of the branches opens, the current in other branches
 - a) Increase, but not double.
 - b) Decrease.
 - c) Unaffected.
 - d) Double.

5. The wave length of a wave in a waveguide is
 - a) is greater than in free space
 - b) depends only on the waveguide dimensions and the free-space wavelength
 - c) is inversely proportional to the phase velocity
 - d) is directly proportional to the group velocity

6. Characteristic impedance of a quarter wave transformer connected in between a load of 100 ohm and a transmission line of characteristic impedance 225 ohms is
 - a) 100 ohm
 - b) 225 ohm
 - c) 600 ohm
 - d) 150 ohm

7. A transverse electromagnetic wave with circular polarization is received by a dipole antenna due to polarization mismatch. The power transfer efficiency from the wave to the antenna is reduced to about

- a) 50%
- b) 35.5%
- c) 25%
- d) 0%

8. The unit of displacement density of a magnetic circuit is

- a) Coulomb / metre
- b) Coulomb / sq. metre
- c) Newton - cm
- d) Amp / metre

9. The derivative of an ideal step function is

- a) an impulse function
- b) zero
- c) sine function
- d) undefined

10. An impulse function consists of

- a) entire frequency range with same relative phase
- b) infinite bandwidth with linear phase variation
- c) pure DC
- d) large DC with weak harmonics

11. The discrete time system described by $y(n) = x(n^2)$ is

- a) causal, linear and time varying
- b) causal, nonlinear and time varying
- c) non-causal, linear and time invariant
- d) non-causal, non linear and time variant

12. What does the transfer function of a system describe for the system?

- a) only zero input response
- b) only zero state response
- c) both zero input and zero state response
- d) neither zero input response nor zero state response

13. Which of the following measures cannot be effective in reducing the noise?
- a) reduction in signaling rate
 - b) increase in transmitted power
 - c) increase in channel bandwidth
 - d) use of redundancy
14. Which among the following type of transformer have smallest size with same electrical specification ?
- a) ONAN type transformer.
 - b) Dry type transformer.
 - c) ONAF type transformer.
 - d) OFWF type transformer.
15. Two transformers operating in parallel will share the load depending upon their ?
- a) Ratings.
 - b) Leakage reactance.
 - c) Efficiency.
 - d) Per unit impedance.
16. Transformer core is laminated,
- a) because it is difficult to fabricate solid core.
 - b) because laminated core provides high flux density.
 - c) to avoid eddy current and hysteresis losses.
 - d) to increase the main flux.
17. The eddy current losses in the transformer will be reduced if ?
- a) The laminations are thick.
 - b) Number of turns in the primary winding is reduced.
 - c) The number of turns in the secondary winding is reduced.
 - d) The laminations are thin.
18. The Buchholz relay is 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.

19. Why are transformer stamping annealed before being used for the building?

- a) to reduce eddy-current loss due to burning of edges
- b) to reduce hysteresis loss due to burning of edges
- c) to give mechanical strength to the core
- d) to increase core permeability

20. As compared to $\Delta - \Delta$ bank, the capacity of the V –V bank of transformers is ---- percent.

- a) 57.7
- b) 66.7
- c) 50
- d) 86.6

21. A transformer on no-load is switched on to a source of voltage. It will draw a current ---

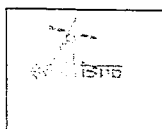
- a) which is the same as the steady-state magnetizing current
- b) which is several times the steady-state magnetizing current, depending upon the initial state of the residual flux in the transformer core.
- c) which is several times the steady-state magnetizing current, independent of the initial state of the residual flux in the transformer core.
- d) which is twice the steady-state magnetizing current provided the core has no residual flux.

22. On the two sides of a star/delta transformer ----

- a) the voltage and current are both in phase
- b) the voltage and current both differ in phase by 30°
- c) the voltage differ in phase by 30° but currents are in phase
- d) the current differ in phase by 30° but voltages are in phase.

23. In a Scott-connected transformer the number of primary and teaser turns respectively are ----

- a) $N, 2/\sqrt{3}N$
- b) $N/2, N$
- c) $\sqrt{3}N/2, N$
- d) $N, \sqrt{3}N/2$



24. The use of higher flux density in the transformer design ---

- a) decreases the total weight / kVA
- b) increases the total weight / kVA
- c) decreases the weight of iron / kVA but increases that of copper
- d) decreases the weight of copper / kVA but increases that of iron

25. The applied voltage of a certain transformer is increased by 50% while the frequency is reduced by 50%. The maximum core flux density will become ---

- a) three times
- b) 1.5 times
- c) 0.5 times
- d) will remain the same.

26. Power input to a transformer on no-load at rated voltage comprises predominantly of

- a) Copper loss
- b) Hysterisis loss
- c) Core loss
- d) Eddy current loss.

27. Distribution transformers have core loss

- a) More than full load copper loss
- b) Equal to full load copper loss
- c) Less than full load copper loss
- d) Negligible compared to full load copper loss

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

- a) SC test.
- b) OC test.
- c) Half time on SC and half time on OC.
- d) Sumpner's test.

29. In power lines, series capacitors are used to----

- a) Improve line frequency.
- b) Compensate inductive reactance.
- c) Compensate capacitive reactance
- d) Balance harmonics.

30. The starting torque of a slip ring induction motor can be increased by

- a) Adding external resistance to rotor
- b) Adding external inductance to rotor
- c) Adding external capacitance to rotor
- d) Adding external RLC circuit to rotor

31. The synchronous speed of a four-pole induction motor operating at 50Hz is

- a) 25rps
- b) 1560 rpm
- c) 3000rpm
- d) 1000rpm

32. A shunt generator has a critical field resistance of 200 ohm at a speed of 800r.p.m. If the speed of the generator is increased to 1000r.p.m., what is the change in critical field resistance of the generator?

- a) Decrease to 160 ohm
- b) Remains the same at 200 ohm
- c) Increases to 250 ohm
- d) Increases to 312.5 ohm

33. A three-phase slip ring induction motor is fed from the rotor side with stator winding short circuited. The frequency of currents flowing in short circuited stator is

- a) Slip frequency
- b) Supply frequency
- c) Frequency corresponding to rotor speed
- d) Zero

34. When the supply voltage to an induction motor is reduced by 10%, the maximum torque decreased by approximately

- a) 5%
- b) 10%
- c) 20%
- d) 40%

35. A 3-phase induction motor is driving full-load torque which is independent of speed. If line voltage drops to 90% of the rated value, percentage increase in motor copper losses
- a) 23%
 - b) -18%
 - c) 123%
 - d) 25%
36. The injected e.m.f in the rotor of an induction motor is of
- a) The same frequency as slip frequency
 - b) The same phase as the rotor e.m.f
 - c) A high value for satisfactory speed control
 - d) The same phase as rotor e.m.f and a high value for satisfactory speed control.
37. If the full-load speed of a 3-phase, 50Hz induction motor is 950 r.p.m, what is its half load speed nearly equal to?
- a) 100 r.p.m
 - b) 450 r.p.m
 - c) 1900 r.p.m
 - d) 975 r.p.m
38. For controlling the speed of an induction motor the frequency of supply is increased by 10%. For magnetizing current to remain the same, the supply voltage must
- a) Be reduced by 10%
 - b) Remain constant
 - c) Be increased by 10%
 - d) Be reduced or increased by 20%
39. The speed of an induction motor is controlled by varying the supply frequency keeping V/f constant, then
- a) Breakdown torque and magnetizing current would both remain constant
 - b) Breakdown torque would remain constant but magnetizing current would increase.
 - c) Breakdown torque would decrease but magnetizing current would remain constant.
 - d) Breakdown torque and magnetizing current both would decrease.

40. A synchronous generator connected to an infinite bus is overexcited. Consider the only reactive power, from the point of view of the system, the machine acts as
- a) a capacitor
 - b) an inductor
 - c) a resistor
 - d) none of these
41. The voltage stress will be maximum in an underground cable at
- a) The surface of the sheath
 - b) The surface of the conductor
 - c) The surface of the insulation.
 - d) The surface of the armour.
42. The dielectric strength of air at a barometric pressure of 76cm and 25 degree centigrade is
- a) 30kv/ metre.
 - b) 21.1kv rms / cm.
 - c) 21.1kv rms / mm.
 - d) 110kv / metre.
43. The positive sequence current of a transmission line is
- a) always zero
 - b) one-third of negative sequence current
 - c) three times the negative sequence current
 - d) equal to negative sequence current
44. For the fault at the terminals of a synchronous generator, the fault current is maximum for a
- a) 3-phase fault
 - b) 3-phase to ground fault
 - c) Line-to-ground fault
 - d) Line-to-line fault
45. The earth transformer is used to
- a) Avoid the harmonics in the transformers
 - b) Provide artificial neutral earthing where neutral point is not accessible
 - c) Improve stability of the system
 - d) Measure the voltage

46. For differential protection of power transformer (delta-delta) the current transformers will have

- a) Delta-delta connection
- b) Star-delta connection
- c) Star-star connection
- d) Delta-star connection

47. For the protection of a very long extra high voltage line, the protective relay used is

- a) Over current with extremely inverse characteristics
- b) Percentage differential relay
- c) Reactance type distance relay
- d) Mho type distance relay

48. Resistance switching is normally employed in

- a) All breakers
- b) Bulk oil breaker
- c) Minimum oil breaker
- d) Air-blast circuit breaker

49. Symmetrical breaking capacity of ACB is

- a) Greater than asymmetrical breaking capacity
- b) Less than asymmetrical breaking capacity
- c) Equal to asymmetrical breaking capacity
- d) not related to asymmetrical breaking capacity

50. By which material the fuse element is generally made

- a) Copper
- b) Nickel
- c) Iron alloy
- d) Silver

51. Grounding is generally done in transmission line at

- a) The supply end
- b) The receiving end
- c) Middle of the line
- d) Anywhere

52. What is the approximate value of the surge impedance loading of a 400kV , 3-phase 50Hz overhead single circuit transmission line

- a) 230 MW
- b) 400 MW
- c) 1000 MW
- d) 1600 MW

53. When two identical first order systems have been cascaded non-interactively the unit step response of the system will be

- a) Over damped
- b) Under damped
- c) Un-damped
- d) Critically damped

54. Which of the following methods is most strong 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.

55. 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

56. Phase margin of a system is used to specify

- a) Relative stability
- b) Absolute stability
- c) Time response
- d) Frequency response

57. The rms value of an alternating current is given by steady DC current which when flowing through a given circuit for a given time produces,

- a) The same heat as produced by AC when flowing through the same circuit.
- b) The less heat than produced by AC when flowing through the same circuit.
- c) The more heat than produced by AC when flowing through the same circuit.
- d) 14.4 calories.

58. AC current cannot be measured directly by

- a) Hot wire ammeter
- b) Moving iron ammeter
- c) Moving coil ammeter
- d) Thermocouple type ammeter

59. The internal resistance of a voltmeter should be very high in order to have

- a) High voltage range
- b) Maximum current through the meter
- c) Minimum current through the meter
- d) More current from the voltage source

60. The resistance of a thermistor

- a) Increases with the increase of temperature
- b) Decreases with the increase of temperature
- c) Remains constant with the increase of temperature
- d) Remains constant with the decrease of temperature

61. The early effect in a bipolar junction transistor is caused by

- a) Fast turn on
- b) Fast turn off
- c) Large collector-base reverse bias
- d) Large emitter-base reverse bias

62. Fermi level for an n-type semiconductor lies

- a) Near valence band
- b) Near conduction band
- c) In valence band
- d) In conduction band

63. For a forward biased pn-junction diode diffusion capacitance varies

- a) Linearly with current
- b) Square of current
- c) Inversely with current
- d) Does not vary with current

64. In a multi-stage R-C coupled amplifier, the coupling capacitor

- a) Limits the low frequency response
- b) Limits the high frequency response
- c) Does not affect the frequency response
- d) Block the d.c. component without affecting the frequency response

65. An operation amplifier should preferably have

- a) Low out put impedance
- b) High out put impedance
- c) Infinite impedance
- d) Impedance is insignificant

66. The output voltage of an operational amplifier is ?

- a) 90 degree out of phase from the input.
- b) 180 degree out of phase from the input.
- c) 45 degree out of phase from the input.
- d) -90 degree out of phase from the input.

67. A class-A transformer coupled, transistor power amplifier is required to deliver a power output of 10 Watts. The maximum power rating of the transistor should be less than

- a) 5 W
- b) 10 W
- c) 20 W
- d) 40 W

68. Which of the following Boolean algebra rules is correct?

- a) $A \cdot \bar{A} = 1$
- b) $A + AB = A + B$
- c) $A + \bar{A}B = A + B$
- d) $A(A+B) = B$

69. In an all NOR gate realization of a combinational circuit all EVEN and ODD level gates behave like

- a) OR and AND
- b) AND and OR
- c) OR and NOT
- d) NOR and AND

70. Use of a reverse conducting thyristor in place of antiparallel combination of thyristor and feedback diode in an inverter:

- a) Effectively minimizes the peak commutating current
- b) Decreases the operating frequency of operation
- c) Minimizes the effects of load inductance on the commutation performance
- d) Causes deterioration in the commutation performance

71. In a resonance pulse inverter:

- a) DC output voltage variation is wide
- b) The frequency is low
- c) The output voltage is never sinusoidal
- d) DC saturation of transformer core is minimized

72. The vectors $x_1 = (1,2,4)$, $x_2 = (2,-1,3)$, $x_3 = (0,1,2)$, $x_4 = (-3,7,2)$ are

- a) Linearly independent
- b) Linearly dependent
- c) No relation
- d) Exponentially dependent

73. Characteristic roots of matrix A and A^T will be

- a) Different
- b) Same
- c) Cannot say about roots
- d) None of these

74. The minimum point of the function $(x^3/3) - x$ is at

- a) $x = 1$
- b) $x = -1$
- c) $x = 0$
- d) $x = 1/\sqrt{3}$

75. The area bounded by the curves $y^2 = 9x$, $x - y + 2 = 0$ is given by
- 1
 - $\frac{1}{2}$
 - $\frac{3}{2}$
 - $\frac{5}{4}$
76. The integrating factor of equation $\sec^2 y \, dy/dx + x \tan y = x^3$ is
- $[e]^{x^2/2}$
 - $[e]^{-x^2/2}$
 - $[e]^{x/2}$
 - $[e]^{-x/2}$
77. An urn contains 5 black and 5 white balls. The probability of drawing two balls of the same colour
- $\frac{2}{9}$
 - $\frac{4}{9}$
 - $\frac{1}{9}$
 - $\frac{5}{9}$
78. Ten percent of screws produced in a certain factory turn out to be defective. Find the probability that in a sample of 10 screws chosen at random, exactly two will be defective.
- 0.2
 - 0.25
 - 0.8
 - 0.3
79. The equation $x^3 - x^2 + 4x - 4 = 0$ is to be solved using the Newton-Raphson method. If $x = 2$ is taken as the initial approximation of the solution, then the next approximation using the method will be
- $\frac{2}{3}$
 - $\frac{4}{3}$
 - $\frac{1}{3}$
 - $\frac{5}{3}$
80. The unique polynomial $P(x)$ of degree 2 such that:
 $P(1) = 1$, $P(3) = 27$, $P(4) = 64$ is
- $8x^2 - 19x + 12$
 - $8x^2 + 19x + 12$
 - $-8x^2 - 19x + 12$
 - $-8x^2 - 19x - 12$

End of questions