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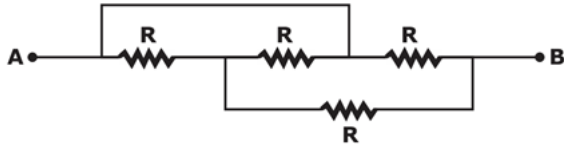
Electrical Engineering

Mega Mock Test - 1

(June 17th - June 18th 2022)

Questions &
Answer Key

1. Resistance between terminals A and B of the given figure is



- A. $\frac{3}{5} R$
- B. $\frac{1}{5} R$
- C. R
- D. $\frac{2}{5} R$

Ans. A

2. The no load current in a transformer lags the supply voltage by

- A. 0°
- B. 90°
- C. 110°
- D. about 75°

Ans. D

3. How many valence electrons are possessed by Germanium?

- A. 0
- B. 1
- C. 2
- D. 4

Ans. D

4. The basic memory cell in a DRAM is a

- A. MOSFET
- B. Capacitor
- C. Capacitor and MOS switch
- D. Flip-Flop

Ans. C

5. When the current in a coil is increased from 2 A to 4 A in 0.05 seconds, the e.m.f. induced in the coil is 8 V. The self inductance of the coil is

- A. 0.8 H
- B. 0.4 H
- C. 0.2 H
- D. 0.1 H

Ans. C

6. A 3-phase circuit breaker is rated at 1250 A, 2000 MVA, 33 kV, 4s. It's making current capacity will be

- A. 35 kA
- B. 89 kA
- C. 79 kA
- D. 69 kA

Ans. B

7. A 10 kVA, 400 V/200 V, single-phase transformer with 10% impedance, draws a steady short circuit current of

- A. 50 A
- B. 150 A
- C. 250 A
- D. 350 A

Ans. C

8. When 30V/cm electric field applied across semiconductor then minority carriers move at a distance by 0.5 cm in 10 μ second then mobility of semiconductor is

- A. 1666.67
- B. 6000
- C. 5000
- D. 1333.33

Ans. A

9. It is advisable to start a DC series motor with some load to:
- A. Avoid Sparking
 - B. Limit the Speed
 - C. Limit the Flux
 - D. Limit the Current

Ans. B

10. A Wattmeter has a full scale range of 2500 Watt. It has an error of 1% of true value. What would be the range of reading if true power is 1250 Watt?
- A. 1225 Watt – 1275 Watt
 - B. 1245 Watt – 1225 Watt
 - C. 1200 Watt – 1300 Watt
 - D. 1237.5 Watt – 1262.5 Watt

Ans. D

11. A capacitor has a capacitance of 5 microfarad. What is the stored energy in the capacitor, if DC voltage of 100 V is applied across it?
- A. 25 joules
 - B. 25/100 joules
 - C. 250/100 joules
 - D. 2.5/100 joules

Ans. D

12. A magnetising force of 800 AT/m will produce a flux density of _____ in air.
- A. 1 Wb/m²
 - B. 1 mWb/m²
 - C. 10 mWb/m²
 - D. 0.5 Wb/m²

Ans. B

13. The advantage of using pulverized fuel include
- A. Higher boiler efficiency
 - B. Easy and complete combustion
 - C. Low air requirement
 - D. All of the above

Ans. D

14. Two resistors of 40 Ω and 40 Ω are connected in series. A wire of negligible resistance is connected in shunt across the combination. The effective resistance will be:
- A. 20 Ω
 - B. Infinity
 - C. Zero
 - D. 80 Ω

Ans. C

15. Which of the following is equivalent to the Boolean function $X'(X'+Y)$?
- A. X
 - B. Y'
 - C. Y
 - D. X'

Ans. D

16. The presence of earth in case of overhead transmission line
- A. increases capacitance
 - B. increases inductance
 - C. decreases capacitance
 - D. decreases inductance

Ans. A

17. Which type of diode can be used as voltage regulator?
- A. Solar cell
 - B. LED
 - C. Zener diode
 - D. Photodiode

Ans. C

18. Reduction in supply voltage by 10% will change the torque of an induction motor by
- A. 38%
 - B. 19%
 - C. 9.5%
 - D. No change

Ans. B

19. In a synchronous motor, damper winding is provided to
- A. stabilize rotor motion
 - B. suppress rotor oscillations
 - C. develop necessary starting torque
 - D. (B) and (C) both

Ans. D

20. Phase difference between the output and input voltage of common collector amplifier is
- A. 90°
 - B. 0°
 - C. 180°
 - D. 270°

Ans. B

21. The maximum starting torque of a 3-phase induction motor occurs when:
- A. rotor resistance is $\frac{3}{4}$ th of the rotor reactance
 - B. rotor resistance is $\frac{1}{4}$ th of rotor reactance
 - C. rotor resistance is $\frac{1}{2}$ th of rotor reactance
 - D. rotor resistance is equal to rotor reactance

Ans. D

22. Class B amplifier is biased
- A. Just at cut-off
 - B. Nearly twice cut-off
 - C. At midpoint of load link
 - D. None of the above

Ans. A

23. Materials used in plate earthing are
- A. Wood coal
 - B. Salt, earthing plate
 - C. (a) and (b) both
 - D. None of the above

Ans. C

24. A resistance, an inductance and a capacitance are connected in series. The values of R , X_L and X_C are 20Ω , 30Ω and 10Ω respectively. The net reactance of the circuit is:
- A. 20Ω
 - B. 10Ω
 - C. 78.28Ω
 - D. zero

Ans. A

25. Let 312 as a number in the base-B number system, where B is unknown. If $(312)_B = (54)_{10}$, then what is the value of the base B?
- A. 6
 - B. 5
 - C. 4
 - D. 12

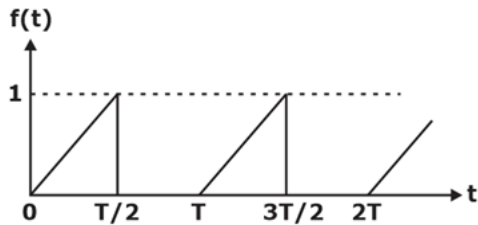
Ans. C

26. Horizontal deflection plates of CRO are placed generally

- A. Horizontal
- B. Vertical
- C. Diagonal
- D. (a) or (b)

Ans. B

27. Find the rms value of the following wave shape: -



- A. $\sqrt{1/3}$
- B. $\sqrt{1/6}$
- C. $\sqrt{2/3}$
- D. 1 / 6

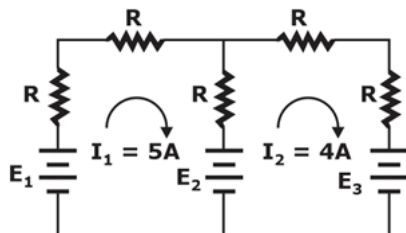
Ans. B

28. Controlling torque in a megger is provided by

- A. Springs
- B. Weights attached to the moving system
- C. It does not need any controlling torque
- D. None of the above

Ans. C

29. In the circuit below, the current through E_2 is



- A. 9 A discharging
- B. 9 A charging
- C. 1 A discharging
- D. 1 A charging

Ans. D

30. Sag of conductors between two electric poles can be determined by

- A. $\frac{WL^2}{8T}$
- B. $\frac{WL^2}{16T}$
- C. $\frac{WL^2}{2T}$
- D. $\frac{WL^2}{T}$

Ans. A

31. Which of the following test is carried out to ensure the sufficient strength of insulation between two or more conductors to avoid leakage between them?

- A. Testing of insulation resistance between wiring and earth
- B. Testing insulation resistance between conductors

- C. Testing of polarity of single-phase switch
- D. Testing of earth continuity path

Ans. A

32. For a fuse wire of diameter 'd', fusing current is proportional to

- A. \sqrt{d}
- B. $d^{1.2}$
- C. $d^{1.5}$
- D. None of these

Ans. C

33. Which of the following is NOT essential for working of an indicating instrument?

- A. Controlling torque
- B. Deflecting torque
- C. Damping torque
- D. Braking torque

Ans. D

34. Minimum clearance above ground of the lowest conductor of an overhead line erected along a street for low and medium voltages as per "Indian Electricity Rules" is

- A. 4.5 metres
- B. 6.1 metres
- C. 6.5 metres
- D. 5.5 metres

Ans. D

35. The purpose of a DC motor starter is to

- A. Start the DC motor
- B. Limit the starting current
- C. Increase the starting torque
- D. Avoid dips in stator voltage

Ans. B

36. Synchronous motors are to be used in situations where

- A. The load is constant.
- B. The load is required to be driven at very high speeds
- C. The load is to be driven at constant speed.
- D. The starting torque requirement of the load is very high.

Ans. C

37. Differential relays are used for the protection of equipment against

- A. Internal faults
- B. Over current
- C. Reverse current
- D. Reverse power

Ans. A

38. The most suitable material for the heating element is

- A. Tungsten
- B. Nichrome
- C. Manganin
- D. Carbon

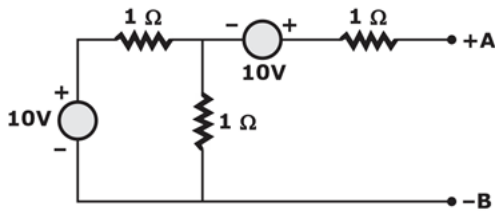
Ans. B

39. Which of the following type of DC generator is most suitable as booster?

- A. Series Generator
- B. Shunt Generator
- C. Compound Generator
- D. Separately Excited Generator

Ans. A

40. In the given circuit, Thevenin voltage across the terminal AB is



- A. -15 V
- B. 15 V
- C. 5 V
- D. 0 V

Ans. B

41. In a capacitor start motor if C_1 is the capacitance required for best starting torque and C_2 is the capacitance required for best running characteristic then:

- A. C_1 approximately equal to C_2
- B. C_1 is equal to C_2
- C. C_1 is much smaller than C_2
- D. C_1 is much larger than C_2

Ans. D

42. When drain saturation electric current is less than I_{DSS} a JFET acts like a

- A. Resistor
- B. Battery
- C. BJT
- D. Current source

Ans. D

43. For heating magnetic materials using induction heating, eddy current and hysteresis losses are respectively proportional to:-

- A. f^2 and f
- B. f and f^2
- C. f^2 and f^2
- D. None of the above

Ans. A

44. At a slip of 4%, maximum possible speed of a 3-phase squirrel cage induction motor is

- A. 2880 rpm
- B. 3000 rpm
- C. 1500 rpm
- D. 1440 rpm

Ans. A

45. If the distance between the light source and the surface is reduced to half, the illumination on the surface will

- A. reduce to half of the original.
- B. reduce to one fourth of the original.
- C. increase to double of the original.
- D. increase to four times of the original.

Ans. D

46. A series RLC circuit resonate at 200 Hz. If the capacitance is increased to four times, the circuit will be in resonance at

- A. 100 Hz
- B. 200 Hz
- C. 400 Hz
- D. 800 Hz

Ans. A

Ans. B

54. In a power transformer, copper losses occur in:

- A. Bushing
- B. Insulating Oil
- C. Core
- D. Windings

Ans. D

55. Ferranti effect on long overhead lines is experienced when

- A. the line is highly loaded.
- B. the power factor is unity.
- C. the power factor is leading.
- D. corona effect is dominated.

Ans. C

56. If the current through a coil having an inductance of 0.5 H is reduced from 5 A to 2 A in 0.05s, calculate the mean value of the EMF induced in the coil.

- A. -15 V
- B. -30 V
- C. -60 V
- D. -10 V

Ans. B

57. In three phase, 400 volt, 50 Hz supply, the phase to neutral voltage is

- A. 220 Volt
- B. 230 Volt
- C. 440 Volt
- D. 150 Volt

Ans. B

58. Light energy radiated per second from a luminous body is known as:

- A. luminous flux
- B. watt
- C. candela
- D. lumen

Ans. A

59. The voltage phasor of a circuit is $10 \angle 15^\circ$ V and the current phasor is $2 \angle -45^\circ$ A . The active and reactive powers in the circuit are

- A. $20\sqrt{2}$ W and $10\sqrt{2}$ VAR
- B. 10 W and $10\sqrt{3}$ VAR
- C. 5 W and $5\sqrt{3}$ VAR
- D. $10\sqrt{3}$ W and -10 VAR

Ans. B

60. In steam locomotive, electric power is provided through

- A. Battery system
- B. Diesel engine generator
- C. Overhead wire
- D. Small turbo generator

Ans. D

61. During the resistance welding heat produced at the joint is proportional to

- A. I^2R
- B. kVA
- C. Current
- D. Voltage

Ans. A

62. Energy meter is a/an:

- A. Integrating Instrument
- B. Recording Instrument
- C. Absolute Instrument
- D. Indicating Instrument

Ans. A

63. In earthing, salt, charcoal etc. are mixed with soil to:

- A. Increase the permeability of the soil
- B. Increase the inductive property of the soil
- C. Increase the resistivity of the soil
- D. Decrease the resistivity of the soil

Ans. D

64. 1 kVA, 230 kVA, 50 Hz, single phase transformer has an eddy current loss of 30 W. The eddy current loss when the transformer is excited by a DC source of same voltage will be:
- A. Zero Watt
 - B. More Than 30 W
 - C. 30 W
 - D. Less Than 30 W

Ans. A

65. Crawling in an induction motor is due to
- A. Space harmonics produced by winding currents.
 - B. Time harmonics in supply.
 - C. Slip ring rotor.
 - D. Insufficient starting torque

Ans. A

66. A generation station has average demand and maximum demand of 48000 kW and 96000 kW respectively. If the plant capacity factor is 0.48, the installed capacity will be:
- A. 200000 kW
 - B. 250000 kW
 - C. 200000 kWh
 - D. 100000 kW

Ans. D

67. Voltage regulation due to Ferranti effect may be:
- A. All of the other options
 - B. Negative
 - C. Zero
 - D. Positive

Ans. B

68. A shaded pole induction motor does not have the advantage of
- A. Rugged construction
 - B. Low initial as well as maintenance cost
 - C. High starting torque
 - D. Comparatively small starting current

Ans. C

69. Choose the correct statement when $V_{GS} = 0$ and $V_{DS} = 0$ in a JFET.
- A. The depletion regions around the p-n junctions are equal in thickness and symmetrical.
 - B. I_D is maximum.
 - C. I_D is half of the maximum value.
 - D. The depletion regions around the p-n junctions are not equal in thickness.

Ans. A

70. Leakage factor in magnetic circuit is defined as:
- A. total flux + useful flux
 - B. total flux \times useful flux
 - C. useful flux / total flux
 - D. total flux / useful flux

Ans. D

71. The rotor of a stepper motor has no

- A. Winding
B. Commutator
C. Brushes
D. All of the above

Ans. D

72. When excitation of synchronous motor is increased up to normal excitation from under excitation, armature current

- A. increases
B. decreases
C. remains constant
D. None of the above

Ans. B

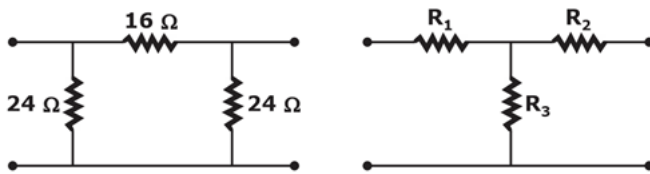
73. An isolated sphere has a capacitance of 50 pf. If its potential is raised to 10^4 volts, radius

and charge will be respectively. Given that $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ m}$.

- A. 54 cm, $0.5 \mu\text{C}$
B. 4.5 cm, $5.0 \mu\text{C}$
C. 45 cm, $0.5 \mu\text{C}$
D. 5.4 cm, $5.0 \mu\text{C}$

Ans. C

74. If the n and T circuits in figure below are equivalent, then R_1, R_2, R_3 respectively are



- A. $9 \Omega, 6 \Omega, 6 \Omega$
B. $6 \Omega, 6 \Omega, 9 \Omega$
C. $9 \Omega, 6 \Omega, 9 \Omega$
D. $6 \Omega, 9 \Omega, 6 \Omega$

Ans. B

75. Earth resistance comprises of

- a. Resistance of soil away from electrode.
b. Contact resistance between electrode and soil.
c. Resistance of metal electrode
A. a only
B. a and b only
C. a and c only
D. a, b and c together

Ans. D

76. The CRT display is made up of small picture elements called pixels. The _____ pixels, the _____ image clarity or resolution of the display.

- A. Smaller, Better
B. Smaller, Poorer
C. Larger, Better
D. Larger, Poorer

Ans. A

77. A relay is connected to a 400/5 current transformer. For a fault current of 2.4 kA and relay setting of 150%, the PSM is:

- A. 8
B. 12
C. 4
D. 16

Ans. C

78. Merz price protection scheme is the one from:

- A. Differential Protection
- B. Over Current Protection
- C. Earth Fault Protection
- D. Distance Protection

Ans. A

79. The step angle of the stepper motor is 2.5° . If the stepping frequency is 3600 pulses per second, then the shaft speed will be

- A. 144 rps
- B. 3600 rps
- C. 25 rps
- D. 2.5 rps

Ans. C

80. Kick fuses are used across relay coils to prevent relay operation during

- A. Heavy external faults
- B. Inrush current of transformer when they are energised
- C. Line to ground faults
- D. Bolted faults

Ans. B

81. Trash rack, forebay, surge tank, spill way are the terms involved with:

- A. Nuclear Power Plant
- B. Thermal Power Plant
- C. Wind Turbine Based Power Plant
- D. Hydroelectric Power Plant

Ans. D

82. A 1 H pure inductor carrying a current of 3 A will store energy of:

- A. 4.5 J
- B. 9 J
- C. 9 W
- D. 4.5 W

Ans. A

83. An ideal voltage source has:

- A. Terminal voltage in proportion to load
- B. Open circuit voltage equal to the voltage on full load
- C. Zero internal resistance
- D. Terminal voltage in proportion to current

Ans. C

84. The function of steel wire in ACSR conductor is to:

- A. Compensation for Skin Effect
- B. Reduce Inductance
- C. Take Care of Surges
- D. Provide Additional Mechanical Strength

Ans. D

85. In a six-pole motor, 4 mechanical degrees is equal to

- A. 4 electrical degrees
- B. 2 electrical degrees
- C. 8 electrical degrees
- D. 12 electrical degrees

Ans. D

86. A transformer has N_1 primary windings and N_2 secondary windings respectively. Its secondary resistance R_2 referred to primary is

- A. $\left(\frac{N_1}{N_2}\right) R_2$
- B. $\left(\frac{N_1}{N_2}\right)^2 R_2$
- C. $\left(\frac{N_2}{N_1}\right) R_2$
- D. $\left(\frac{N_2}{N_1}\right)^2 R_2$

Ans. B

87. Official systematic, scientific study of energy consumption by the related organisation for cost reduction and energy conservation is

- A. energy policy
- B. energy audit
- C. (a) and (b) both
- D. None of the above

Ans. C

88. By burden on the relay, we generally mean

- A. Current rating of relay
- B. Voltage rating of relay
- C. Volt-ampere rating of relay
- D. Watt rating of relay

Ans. C

89. A voltmeter has a resistance of 2000. When it is connected across a DC circuit, its power consumption is 2 mW. Suppose this voltmeter is replaced by a voltmeter of 4000 resistance, the power consumption will be: -

- A. 1 mW
- B. 2 mW
- C. 4 mW
- D. 8 mW

Ans. A

90. In single phase energy meter, the voltage coil should be?

- A. Highly inductive
- B. Highly capacitive
- C. Highly resistive
- D. None of these

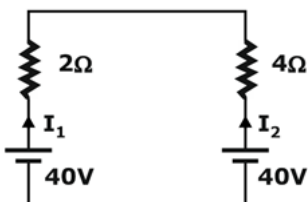
Ans. A

91. In dec base bias voltage of a npn transistor made of silicon is 10V and input base resistor is 100 kΩ. Then the value of base current into the transistor.

- A. 9.3 mA
- B. 9.3 μA
- C. 930 mA
- D. 93 μA

Ans. D

92. Which of the following options is true for the given circuit?



- A. $I_1 = -2I_2$
- B. $I_2 > I_1$
- C. $I_1 = 2I_2$
- D. No current in the loop

Ans. D

93. A pure inductor has power factor of
- A. 1
 - B. $1/\sqrt{2}$
 - C. 0
 - D. None of these

Ans. C

94. The voltage phasor of a circuit is $10 \angle 15^\circ$ V and current phasor is $2 \angle -45^\circ$ A. The reactive power in the circuit will be
- A. $17.32 V_{AR}$
 - B. $10\sqrt{2} V_{AR}$
 - C. $8.66 V_{AR}$
 - D. None of these

Ans. A

95. Choose inverse transducer from these
- A. Thermocouples
 - B. Analog ammeter
 - C. Resistance potentiometer
 - D. L.V.D.T

Ans. B

96. Forbidden energy gap in an atom is the gap between the: -
- A. First and second band
 - B. Second and valance band
 - C. First and valance band
 - D. Valence band and conduction band

Ans. D

97. The economiser of steam turbine system is located in the:
- A. Turbine Circuit
 - B. Feeding Water Circuit
 - C. Coal Handling Plant
 - D. Condenser Circuit

Ans. B

98. Series resistance required to read 0-250 V with a moving coil instrument of internal resistance 2 ohm and full scale deflection of 50 mA is
- A. 49998Ω
 - B. 4998Ω
 - C. 498Ω
 - D. 49.8Ω

Ans. B

99. Each flip-flop in a 4-bit ripple counter introduces a maximum delay of 40 n sec. The maximum clock frequency is
- A. 2.65 MHz
 - B. 6.25 MHz
 - C. 5.26 MHz
 - D. 6.52 MHz

Ans. B

100. Which has the highest mobility?
- A. Proton
 - B. Electron
 - C. Neutron
 - D. Ions

Ans. B
