129/2024

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. Under which of the following circumstances current flow through an electric circuit is possible?

    (i)   If the circuit is in closed condition

    (ii) If sufficient voltage drop is available

    (A) (i) only   (B) (ii) only

    (C) Both (i) and (ii)   (D) None of the above

2. Commercial unit of electrical energy is :

    (A) Kilowatt-hour   (B) Kilo calorie

    (C) Horse power   (D) Megawatt

3. In an electric circuit at constant temperature the relationship between current, voltage and resistance is given by :

    (A) Kirchhoff's laws   (B) Ohm's law

    (C) Faraday's law   (D) Lenz's law

4. Two bulbs 200 Watts and 100 Watts both rated at 100 V are connected in series to a 200 volts dc supply. Total power consumed by this circuit is ———————— Watts.

    (A) 133.33   (B) 300

    (C) 200   (D) 266.67

5. N number of resistances each of value R are connected in parallel. When these resistances are connected in series, equivalent resistance is increased by ——————— times.

    (A) 2N   (B) N

    (C) N^2 (D) N/2

6. A wire by resistance of R ohms is stretched such that its length becomes double keeping the volume same. The new resistance will be ——————— Ohms.

    (A) R   (B) 2R

    (C) R/2   (D) 4R

7. Which of the following properties does not hold good for a series circuit?

    (A) Currents are additive   (B) Voltages are additive

    (C) Powers are additive   (D) Resistances are additive

8. 50 numbers of dry cells each having 1.5 V and internal resistance of 0.2 Ω are connected in series across a 40 Ω resistor. Calculate the current through the resistor :

    (A) 1 A
    (B) 1.5 A
    (C) 1.25 A
    (D) None of these

9. A resistor of 10 Ω is connected in series with a combination of 60 Ω and 30 Ω in parallel. A voltage of 220 V is applied across the whole circuit. Determine the current taken from the supply :

    (A) 7.33 A
    (B) 21.89 A
    (C) 2.2 A
    (D) 330 A

10. Which one of the following lamps has the lowest resistance?
    (i)   220 V 40 W
    (ii) 220 V 60 W
    (iii) 220 V 100 W
    (iv) 220 V 200 W

    (A) 220 V 40 W
    (B) 220 V 100 W
    (C) 220 V 60 W
    (D) 220 V 200 W

11. Work done in moving a unit positive charge from infinity to a point is called :
    (A) Potential difference
    (B) Potential
    (C) Potential gradient
    (D) None of these

12. The term analogous to electric current in magnetic circuit is :
    (A) MMF
    (B) Reluctance
    (C) Flux
    (D) None of these

13. Direction of induced current in a coil rotating in a magnetic field can be determined by :
    (A) Right hand thumb rule
    (B) Flemings left hand rule
    (C) Flemings right hand rule
    (D) All of these

14. If three different capacitors are connected in series to a dc supply, the greater voltage will appear across the capacitor having ————— capacitance.
    (A) Largest
    (B) Smallest
    (C) Cannot be predicted
    (D) Equal voltage will appear

15. Three equal capacitors are provided. In which of the following combinations least equivalent capacitance value will be obtained?
    (A) When all in series
    (B) When all in parallel
    (C) Two in series and the third one in parallel with the combination
    (D) Two in parallel and third one in series with the combination

16. As per Flemings left hand rule fore finger indicates the direction of :

    (A) Current   (B) Motion

    (C) Induced emf   (D) Magnetic field

17. Two coils of inductance $L1$ and $L2$ are placed adjacent to each other such that magnetic flux in coil 1 completely links with coil 2. The mutual inductance between the coils is :

    (A) $\sqrt{L1\,L2}$ (B) $L1 + L2$

    (C) $\dfrac{L1}{L2}$ (D) $\dfrac{L1 + L2}{2}$

18. Which one of the following components will oppose changes in current through the circuit?

    (A) Resistance   (B) Inductance

    (C) Capacitance   (D) All of the above

19. Three capacitors having capacitances 2F, 3F, 4F respectively are connected in series and in parallel. Calculate the equivalent capacitance for each combinations :

    (A) 9F in series and 10.083F in parallel

    (B) 9F in series and 0.923F in parallel

    (C) 0.923F in series and 9F in parallel

    (D) 10.083F in series and 9F in parallel

20. It is found that when the current through an inductive coil decreases from 8A to zero in 0.4 seconds, a 40 V emf is induced in it. The inductance of the choke coil is ————— Henry.

    (A) 5   (B) 10

    (C) 64   (D) 2

21. Two sinusoidal current are given by the equation $i_1 = 30\sin(\omega t + \pi/3)$ and $i_2 = 50\sin(\omega t - \pi/4)$. The phase difference between the current is :

    (A) 105 degrees   (B) 75 degrees

    (C) 15 degrees   (D) 60 degrees

22. An AC supply of frequency 50 Hz is connected to a capacitor offered a reactance of 10 Ω. If the frequency is increased to 100 Hz reactance become :

    (A) 20 Ω (B) 5 Ω

    (C) 2.5 Ω (D) 40 Ω

23. In a parallel resistance inductance (RL) circuit, if I_R is the current in the resistor and I_L is the current in the inductor, then :

(A) I_R lag I_L by 90 degrees

(B) I_R lead I_L by 270 degrees

(C) I_L lead I_R by 270 degrees

(D) I_L lag I_R by 90 degrees

24. In an AC series circuit, higher Q factor indicate :

(A) Greater its band width

(B) Sharper its resonance

(C) Broader its response curve

(D) Narrower its pass band

25. The symbol 'j' represents counterclockwise rotation vector through :

(A) 180 degrees

(B) 90 degrees

(C) 360 degrees

(D) 270 degrees

26. The phase sequence of a three phase is reversed to the three phase load, then :

(A) Phase power is changed

(B) Phase current are changed

(C) Phase currents changed in angle but not in magnitude

(D) Total power consumed is changed

27. The main problem occur in a low power factor circuit is :

(A) More power is consumed by the load

(B) Current required for a given load power higher

(C) Active power developed by a generator exceeds its rated output capacity

(D) Heat generated is more than the desired amount

28. For the same rating, the size of a three phase motor will be :

(A) Less in size

(B) More in size

(C) Same in size

(D) None of the above

29. Three resisters are connected in delta and three phase supply given to that circuit then one resistor is open, power will be :

(A) Zero

(B) Reduced by 1/3

(C) Reduced to 1/3

(D) Unaltered

30. If the B phase of a three phase star connected alternator become reverse connected by mistake, it will not affect :

(A) V_{YB}

(B) V_{RY}

(C) V_{BR}

(D) V_{BY}

31. The meter that is suitable only for direct current measurement is :

    (A)   Moving iron type   (B)   Hot wire type

    (C)   Permanent magnet type   (D)   Electro dynamic type

32. The damping torque acts on the moving system of an indicating instrument only when it is :

    (A)   Stationary   (B)   Near its full scale deflection

    (C)   Just starting to move   (D)   Moving

33. The full scale deflection current of a moving coil instrument is about :

    (A)   50 mA   (B)   1 A

    (C)   2 A   (D)   3 A

34. Maxwell – Wein Bridge is used for measuring :

    (A)   Capacitance   (B)   Dielectric loss

    (C)   Inductance   (D)   Phase angle

35. The main purpose of an instrument transformer use in ac measurement is :

    (A)   Provide high transformation ratio

    (B)   Eliminate instrument corrections

    (C)   Extend the range of an instrument

    (D)   Reduce the possibility of shock

36. A 10 MHZ CRO has :

    (A)   5 MHZ sweep   (B)   10 MHZ vertical oscillator

    (C)   10 MHZ supply frequency   (D)   10 MHZ horizontal oscillator

37. The two pressure coils of a single phase power factor meter have :

    (A)   The same dimensions and the same number of turns

    (B)   The same dimensions but different number of turns

    (C)   The same number of turns but different dimensions

    (D)   None of the above

38. An insulation megger is usually :

    (A)   Moving iron type instrument   (B)   Electrostatic type instrument

    (C)   Hot wire type instrument   (D)   Moving coil type instrument

39. Which instrument is most suitable for the measurement of 10 mV at 50 MHz?

    (A)   Moving iron voltmeter   (B)   VTVM

    (C)   CRO   (D)   Moving coil voltmeter

40. Output of a digital multimeter is :

    (A)   Mechanical quantity   (B)   Optical quantity

    (C)   Analog quantity   (D)   Electrical quantity

41. Which is the best fire extinguisher used for subsiding the fire on electrical equipment?

    (A)   Liquid carbon dioxide   (B)   Cold water

    (C)   Dry sand   (D)   Heavy blanket

42. Which of the following is not a first aid treatment for an electric shock?

    (A)   Remove the victim from the electrical shock

    (B)   Begin CPR (Cardiopulmonary Resuscitation) if necessary

    (C)   Send the victim for the doctor

    (D)   Give water to the victim to drink

43. The rated voltage of a standard lead-acid cell :

    (A)   1.2 volts   (B)   1.5 volts

    (C)   2 volts   (D)   6 volts

44. Battery capacity depends on :

    (A)   the size and number of plates

    (B)   the quantity of active material present

    (C)   the quantity of electrolyte

    (D)   all of the above (A), (B) and (C)

45. The most common type of rechargeable battery used in electric vehicles :

    (A)   lead-acid battery   (B)   nickel-cadmium battery

    (C)   lithium-ion battery   (D)   All of the above

46. Which of the following material is used for making solar cell?

    (A)   Carbon   (B)   Magnesium

    (C)   Sodium   (D)   Silicon

47. Solar cell converts light energy in to :

    (A)   thermal energy   (B)   electrical energy

    (C)   chemical energy   (D)   sound energy

48. Which of the following device is having least tripping current?

    (A)   MCCB   (B)   ELCB

    (C)   MCB   (D)   Relay

49. A typical output of a single junction silicon solar cell is ——————— volt.

    (A) 0.6   (B) 1.2

    (C) 1.5   (D) 2

50. A safety device is used in an electric circuit for protecting the :

    (A) Operator   (B) Equipment

    (C) Electric circuit   (D) All of the above

51. The purpose of an electric circuit breaker is :

    (A) to protect an individual electrical circuit from excessive voltage flow

    (B) to protect an individual electrical circuit from excessive current flow

    (C) to serve as an ON-OFF switch

    (D) to serve as an energy saving device

52. Resistance of a wire is directly proportional to its :

    (A) cross sectional area   (B) length

    (C) both (A) and (B)   (D) none of these

53. The reciprocal of resistivity is known as :

    (A) reluctance   (B) resistance

    (C) conductivity   (D) inductance

54. Which of the following can use as a star-delta starter?

    (A) SPST   (B) SPDT

    (C) TPST   (D) TPDT

55. Candela is the unit of :

    (A) flux density   (B) flux intensity

    (C) luminous intensity   (D) luminous flux

56. ——————— is used as filament in the incandescent lamps.

    (A) Tungsten   (B) Copper

    (C) Thorium   (D) Titanium

57. The rewireable fuses are standardized for rated current up to ——————— Ampere.

    (A) 100   (B) 200

    (C) 300   (D) 500

58. The ratio of illumination under normal working condition to the illumination when everything is clean is known as

    (A) Depreciation factor   (B) Utilisation factor

    (C) Absorption factor   (D) Reduction factor

59. Which type of earthing is preferred at places where soil is rocky with a earth bed over it?

    (A) Pipe earthing   (B) Plate earthing

    (C) Strip earthing   (D) Rod earthing

60. The initial colour of a sodium vapour lamp when it is switched on :

    (A) Pink   (B) Blue

    (C) Yellow   (D) White

61. The greatest eddy current loss occurs in ⸻⸻⸻ of d.c machine.

    (A) field poles   (B) yoke

    (C) commutating   (D) armature poles

62. In which of the following method the supply voltage to the separately excited d.c motor is revered?

    (A) Forward motoring   (B) Forward regenerative braking

    (C) Forward dynamic braking   (D) Forward plugging

63. The rheostatic speed control method of d.c machine is very :

    (A) economical

    (B) efficient

    (C) unsuitable for rapidly changing loads

    (D) suitable for getting speeds above the normal

64. The armature of a d.c machine having 10 poles is rotating at a speed of 10 revolutions per second. The number of hysteresis loops formed per second is :

    (A) 100   (B) 10

    (C) 150   (D) 50

65. Which of the following DC motors can run on zero speed regulation even at loaded condition?

    (A) Shunt motor   (B) Differential compound motor

    (C) Series motor   (D) Cumulative compound motor

66. The type of d.c generator for arc welding is :

    (A) Series   (B) Shunt

    (C) Cumulatively compound   (D) Differentially compound

67. The line representing the critical resistance of a d.c generator ⸻⸻⸻ its O.C.C.

    (A) intersects   (B) runs parallel to

    (C) just touches   (D) none of the above

68. If P is the number of poles of generator and N is the armature speed in rpm then frequency f of magnetic reversal is :

(A) $f = \dfrac{NP}{120}$ (B) $f = \dfrac{NP}{60}$

(C) $f = \dfrac{NP}{240}$ (D) $f = \dfrac{NP}{30}$

69. Swinburne's test cannot be performed on which of the following motors?

(A) Shunt DC motor

(B) Series DC motor

(C) Separately excited DC motor

(D) Conducted for all types of DC motors

70. The torque-speed characteristics of a d.c shunt motor is :

(A) a rectangular hyperbola   (B) a drooping straight line

(C) a parabola   (D) none of the above

71. The starting torque of 3 phase induction motor is ——————— supply voltage.

(A) independent of   (B) directly proportional to

(C) directly proportional to square of   (D) none of the above

72. Auto Transformer can do the following :

(A) Step up voltage   (B) Step down voltage

(C) Both (A) and (B)   (D) None of these

73. The maximum value of torque angle of synchronous motor is :

(A) 45º   (B) 90º

(C) 135º   (D) 180º

74. When an induction motor is running at full load rotor reactance is ————— rotor resistance.

(A) Comparable to   (B) Very large compared to

(C) Large compared to   (D) None of the above

75. Which type of alternator used is used in hydroelectric power station?

(A) Non salient pole   (B) Turbo generator

(C) Steam turbine   (D) Salient pole

76. All day efficiency is meant to judge the performance of a transformer :

(A) Distribution   (B) Auto

(C) Power   (D) Two winding

A 10kVA, 230/1000 V single phase transformer the no load current will be about :

    (A)   0.5 A   (B)   3 A

    (C)   8 A   (D)   10 A

78. A transformer transforms :

    (A)   Voltage   (B)   Current

    (C)   Power   (D)   Frequency

79. At leading power factor, the armature flux in an alternator :

    (A)   Distorts the rotor flux   (B)   Aids the rotor flux

    (C)   Opposes the rotor flux   (D)   Does not affects the rotor flux

80. A transformer has full load copper loss of 400 W. The copper loss of at half full load will be :

    (A)   100 W   (B)   200 W

    (C)   400 W   (D)   None of the above

81. Which of the following flip flop is not free from race around condition?

    (A)   D flip flop   (B)   SR flip flop

    (C)   T flip flop   (D)   Master slave JK flip flop

82. The given flip flop was initially cleared and then clocked for 5 pulses, the sequence at Q will be (including the initial pulse) :

    (A)   01110   (B)   00110

    (C)   00011   (D)   01010

83. The group of bits 10010 is serially shifted (LSB first) into a 5 bit parallel output right shift register with an initial state 10100. After 3 clock pulses, the register contains :

    (A)   11010   (B)   01010

    (C)   10101   (D)   01110

84. An 8 bit DAC produces an output of 0.05V for a digital input of 00000001. The full scale output voltage is nearly :

    (A)   22.8   (B)   12.8

    (C)   27.8   (D)   15.8

85. The minimum number of NAND gates used to realize the function $Y = A + AB' + AB'C$ is :
   (A) 1   (B) 2
   (C) 0   (D) 3

86. The counter having most speed is :
   (A) Synchronous counter   (B) Ripple counter
   (C) Ring counter   (D) Johnson counter

87. A 4 bit parallel adder circuit is to be implemented. For this the number of half adders and OR gates required if there is no initial carry is :
   (A) 8 half adders and 4 OR gates   (B) 7 half adders and 3 OR gates
   (C) 8 half adders and 3 OR gates   (D) 7 half adders and 4 OR gates

88. The number of comparators in a 4 bit flash ADC is :
   (A) 5   (B) 4
   (C) 16   (D) 15

89. If $x = 1$ and $y = 1$ initially, and then y is replaced by a sequence 101 then the outputs A and B are :
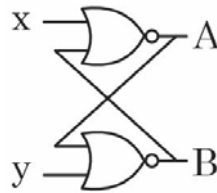
   (A) A = 1 and B = 101   (B) A = 0 and B = 110
   (C) A = 1 and B = 010   (D) A = 0 and B = 010

90. The main purpose of flux in soldering is to :
   (A) Reduce melting point
   (B) Ensure proper texture
   (C) Keep the metal surface clean and oxide free
   (D) Reduce temperature

91. On comparing Centre tap and Full wave bridge rectifiers, the dominant advantage of bridge rectifiers is :
   (A) Lower ripple factor
   (B) Higher efficiency
   (C) High current carrying capacity
   (D) Lower peak inverse requirement for the diode

92. A JFET, when properly biased act as, :
   (A) Current controlled voltage source
   (B) Current controlled current source
   (C) Voltage controlled voltage source
   (D) Voltage controlled current source

93. In a JFET, after V_{PS} reaches pinch-off value V_P, drain current S_D becomes, :

    (A)   Low   (B)   Zero

    (C)   Saturated   (D)   Reversed

94. A DIAC is equivalent to :

    (A)   A pair of four layer SCR's   (B)   Triac with two gates

    (C)   Diode with two resistors   (D)   A pair of SCR's

95. A TRIAC can be triggered into conduction by :

    (A)   Positive or negative voltage at either anode

    (B)   Positive or negative voltage at either gate

    (C)   Both (A) and (B)

    (D)   Only positive voltage at either anode

96. The structure of IGBT is :

    (A)   pnpn structure connected by a MOS gate

    (B)   npnp structure connected by a MOS gate

    (C)   pnp structure connected by a MOS gate

    (D)   nnpp structure connected by a MOS gate

97. Snubber circuit is used to :

    (A)   Limit the rate of conduction period of SCR

    (B)   Limit the rate of rise of voltage across SCR

    (C)   Limit the rate of rise of current across SCR

    (D)   None of these

98. The intrinsic stand-off ratio of a UJT can be :

    (A)   1.1   (B)   1.5

    (C)   0.7   (D)   1

99. Larger the value of filter capacitor :

    (A)   Larger will be the peak to peak value of ripple voltage

    (B)   Larger will be the value of peak current in the rectifying diode

    (C)   Smaller the dc voltage across the load

    (D)   None of these

100. Which of the following part makes an online UPS different from offline UPS?

    (A)   AC/DC rectifier   (B)   Static switch

    (C)   Battery   (D)   Charge controller

———————

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