

030/2016

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. Three resistances each having a value of a Ohm are connected to form a Y structure. If a 3 phase balanced supply with a line voltage of A volts is applied, then the power drawn per phase from the supply is :
(A) $A^2/3a$ (B) $3A^2/a$
(C) A^2/a (D) None of the above
2. A 230V, 50Hz, 1ϕ supply is connected to the series combination of a pure resistance of 50Ω a pure variable capacitor of $25\mu F$ and a pure variable inductor of $1.5mH$. By properly adjusting the component values, it is made that the current through the circuit is maximum. What is the power factor of the circuit now?
(A) 0.866 (B) 0.5
(C) Zero (D) 1
3. In 3ϕ power measurement using 2 Wattmeter method, both the Wattmeters are reading positive and equal. This is because :
(A) The load is purely resistive (B) The load power factor is 0.5
(C) The phase sequence is RBY (D) The load is purely capacitive
4. A dc source of EMF E Volts and internal Resistance, R Ohms is connected to a variable load and it is adjusted such that the load abstracts maximum power from the source. The current drawn from the source is :
(A) $4E/R$ (B) $2E^2/R$
(C) E/R (D) $E/2R$
5. The minimum number of NAND gates required to implement a NOR gate is :
(A) 1 (B) 2
(C) 3 (D) none of the above
6. If A and B are boolean variables, the boolean expression $A + AB$ is :
(A) 0 (B) B
(C) 1 (D) A
7. Which one among Aluminum, Constantantan Mercury, Carbon have highest resistivity :
(A) Aluminum (B) Constantantan
(C) Mercury (D) Carbon
8. For a two terminal device, resistance decreases when the temperature increases, the device is :
(A) made up of a metal (B) a semiconductor
(C) a dielectric (D) none of the above

9. Which one among the following has 2 fully stable states?
 (A) Astable multivibrator (B) Sweep generator
 (C) Flipflop (D) None of the above
10. In a hydro electric generation system, pressure variations due to rapid changes in velocity of water is mitigated using :
 (A) Tailrace pipe (B) Penstock
 (C) Surge tank (D) None of the above
11. In a complex network containing active voltage sources with zero internal resistances and linear bilateral elements the open circuit voltage across 2 terminals is 25V and the resistance of the network viewed from the open circuited terminal is 6.25Ω . If an equivalent circuit comprising of only a current source and impedance is made, the current source rating is :
 (A) 25A (B) 6.25A
 (C) 12.5A (D) 4A
12. A three phase balanced delta connected load of $5 + j6$ Ohm in each phase is connected to a line voltage of 400V is drawing a current from the supply. If another delta connected load of same nature and magnitude is connected in parallel, the line current drawn from the supply becomes :
 (A) Double (B) Four times
 (C) Less than half (D) One fourth
13. In an synchronous generator, selective elimination of odd harmonics can be done by :
 (A) Distribution of winding (B) Symmetrical winding
 (C) Short coding of winding (D) None of these
14. The surface integral of the normal component of Electric Field Intensity over a closed surface is equal to $\frac{1}{\epsilon_0}$ times the total charge inside it. This is the statement of :
 (A) Gauss's Theorem (B) Stoke's Theorem
 (C) Maxwell's Theorem (D) Poisson's Theorem
15. Smooth cylindrical type rotors with less diameter and large axial length are used for Synchronous generators driven by :
 (A) Water turbines (B) Radial turbines
 (C) Steam turbines (D) None of the above
16. If the number of poles in a synchronous machine is 6, a slot angle of 10° mechanical, when expressed in electrical degrees is :
 (A) 60 (B) 20
 (C) 30 (D) 15

17. If the number of turns of an inductive coil is doubled and core length is quadrupled, other parameters being the same, the inductance of the coil became :
- (A) doubled (B) halved
(C) quadrupled (D) unchanged
18. Which one among the following is TRUE regarding the selection of working flux density in transformer design?
- (A) High flux density in the core results into the reduction in Core loss
(B) High flux density in the core results into an increase in Copper loss
(C) High flux density in the core results into high all day efficiency
(D) High flux density in the core results into saving in cost of iron
19. If the ratio of average charge voltage to average discharge voltage in a lead acid cell is $4/3$, the ratio of its Watt Hour efficiency to Ampere hour efficiency is :
- (A) 0.75 (B) $4/3$
(C) $16/9$ (D) None of the above
20. A three phase induction motor runs at 2% slip and its rotor frequency is 1Hz. Stator frequency in Hertz is :
- (A) 60 (B) 50
(C) 40 (D) 20
21. To have a smooth, quiet running of an induction motor by reducing humming and to prevent cogging, the technique used is called :
- (A) Damping (B) Concentrating
(C) Skewing (D) None of the above
22. If the flux per pole of a shunt-wound DC generator is halved and the number of poles is doubled, the generated e.m.f. at constant speed :
- (A) remains the same (B) doubled
(C) is halved (D) none of the above
23. In dc generators, the winding used in a machine delivering low voltage, high current load is :
- (A) progressive simplex wave winding (B) lap winding
(C) any type of wave winding (D) any of the above
24. Which among the following can support a synchronous motor in Starting :
- (A) Damper winding (B) Frequency divider
(C) Interpole (D) All the above

25. Two reaction theory is used in the analysis of Synchronous machine to take into account the :
- (A) Difference in the number of poles in stator and rotor of a Cylindrical pole machine
 - (B) Non uniformity of air gap between stator and rotor of a salient pole machine
 - (C) Non uniformity of air gap between stator and rotor of a cylindrical pole machine
 - (D) Difference in the number of poles in stator and rotor of a salient pole machine
26. In a transformer delivering a variable load, Zero voltage regulation can occur at :
- (A) 0.45 lagging power factor load
 - (B) unity power factor load
 - (C) 0.8 lagging power factor load
 - (D) 0.7 leading power factor load
27. In an alternating voltage supply of constant voltage feeding a Transformer, the presence of higher order harmonics can cause significant changes in :
- (A) Copper losses
 - (B) Regulation
 - (C) Core losses
 - (D) All of the above
28. The Maximum percentage efficiency of a 1KVA transformer with iron losses equal to 125 W at upf load is :
- (A) 90
 - (B) 72
 - (C) 60
 - (D) 80
29. Which among the following logic families are fastest in operation?
- (A) ECL
 - (B) TTL
 - (C) CMOS
 - (D) DTL
30. De Morgan's Law says :
- (A) NOR Gate is NOTed AND Gate
 - (B) NAND Gate is NOTed OR Gate
 - (C) Both (A) and (B) above
 - (D) None of the above
31. Which of the following is/are the features of an Asynchronous counter?
- (A) The same clock pulses are applied to all the constituent Flip flops at a time
 - (B) Outputs of the flip flop are connected to the inputs of the very next flip flop
 - (C) Propagation delay limits the speed of operation
 - (D) None of the above
32. Which one of the following is fully CORRECT regarding 8085 microprocessor?
- (A) It does not support handshaking in I/O operations
 - (B) It has only 6 flags
 - (C) It supports queue
 - (D) It has hardware and software interrupts

33. Which among the following is TRUE about an 8086 microprocessor?
 (A) Its address and data bus are multiplexed
 (B) Its accumulator size is 32 bit
 (C) It supports the queue/pipelining feature
 (D) It does not have Master and Slave Mode operations
34. The excess-3 code corresponding to decimal number 156 is :
 (A) 100010001010 (B) 010010110011
 (C) 010010001001 (D) None of the above
35. A Mod-31 synchronous Counter ideally has _____ number of flipflops.
 (A) 6 (B) 3
 (C) 4 (D) 5
36. Which among the following is/are TRUE regarding the OP AMP circuit?
 (A) Voltage follower employs positive feedback
 (B) Integrator amplifies noise
 (C) In Differentiator, gain is increased with an increase in frequency
 (D) Adder always have an attenuation
37. When comparing Active and Passive filters, which of the following statements are Wrong?
 (A) Active filters require power source(s)
 (B) Active filters have high input impedance
 (C) Active filters have low output impedance
 (D) All the above are correct
38. For unipolar operation, an 8 bit Digital to Analog Converter has a resolution of :
 (A) 128 (B) 256
 (C) 64 (D) Given data insufficient
39. In a circuit containing a transistor, both of its junctions are forward biased. It operates in _____ region.
 (A) Cut off (B) Saturation
 (C) Active (D) Pinch off
40. Number of valance electrons in Germanium is :
 (A) 2 (B) 5
 (C) 6 (D) 4
41. The Switched Mode Power Supplies have higher energy efficiency compared to Linear Power Supplies because :
 (A) it uses isolation transformers
 (B) it has devices with large space charge capacitance
 (C) it does not work in active region
 (D) it has high switching frequency

42. Gain of an amplifier can be stabilized by :
- (A) Employing Positive feedback (B) Employing Negative feedback
(C) Proper dc bias (D) Proper dc isolation
43. If only 5 bites are used for addressing the memory of a computer system, the memory size is :
- (A) 64 (B) 128
(C) 32 (D) 256
44. The ripple factor and efficiency of a half wave rectifier are respectively :
- (A) 1.21 and 81.2% (B) 1.21 and 40.6%
(C) 0.482 and 81.2% (D) 0.482 and 40.6%
45. For a short transmission with series impedance Z , all the capacitances being negligibly small, the ABCD constants of the line are :
- (A) $A = 1, B = Z, C = 0, D = 1$ (B) $A = Z, B = 1, C = 1, D = 0$
(C) $A = 1, B = 0, C = Z, D = 1$ (D) $A = Z, B = 1, C = 0, D = 1/Z$
46. The load flow analysis algorithm having the least rate of convergence is :
- (A) Newton Raphson Method (B) Fast Decoupled Load-Flow Method
(C) Gauss Seidel Method (D) None of the above
47. The Opposition to the flow of current in a conductor can increase in alternating circuits compared to dc circuits due to :
- (A) Proximity effect (B) Skin effect
(C) Ferranti effect (D) (A) and (B) above
48. What is meant by a flat line or Infinite line?
- (A) Line open circuited
(B) Line with surge impedance equals the characteristic impedance
(C) Line terminated with charesteric impedance
(D) Line through which Power transmitted is high
49. Which one among the following is a method for equalizing the potential across the various units of a string insulator?
- (A) Usage of smaller cross arm (B) Usage of step grading
(C) Dynamic sheilding (D) All of the above
50. Under ground cables are less preferable in high voltage transmission because of :
- (A) poor insulation (B) high charging current
(C) safety (D) none of the above

51. The metals normally used in a HRC fuse are :
- (A) Tin and lead (B) Tin and Silver
(C) Aluminium and lead (D) Aluminium and Copper
52. The transient stability of a power system can be improved by :
- (A) Using rotor of lower Moment of Inertia for generator
(B) Using parallel lines
(C) Using low system voltage
(D) None of the above
53. For economic load dispatch :
- (A) Incremental efficiency of each machine should be same
(B) Incremental production cost of each machine should be same
(C) Incremental fuel cost of each machine should be same
(D) None of the above.
54. In a power system, the cost of generated electrical energy will be low if :
- (A) both load factor and diversity factor are low
(B) both load factor and diversity factor are high
(C) Load factor high. Diversity factor low
(D) Load factor low, Diversity factor high
55. An over excited synchronous machine has a lagging powerfactor. The machine is :
- (A) Motoring (B) Generating
(C) Floating (D) Can be Generating or motoring
56. Which among the following is/are CORRECT about an RC phase shift oscillator?
- (A) The RC network provides a phase shift of 180°
(B) It makes use of positive feedback
(C) Loop gain of the oscillator is almost one
(D) All the above
57. In class B operation of power amplifiers, the collector current flows for :
- (A) Less than a quarter of a cycle (B) The whole cycle
(C) Half the cycle (D) Less than half a cycle
58. For the characteristic equation $2S^4 + S^3 + 3S^2 + 5s + 10 = 0$, the number of roots in the left half S plane is :
- (A) 2 (B) 1
(C) 3 (D) 4