



Ph.D ENTRANCE EXAMINATION, JUNE -2016

1. Consider a  $3 \times 3$  matrix with every element being equal to 1. Its only non-zero eigen value is \_\_\_\_\_.

A. 1

B. 2

C. 3

D. 4

Ans: C

2. The maximum value attained by the function  $f(x) = x(x-1)(x-2)$  in the interval  $[1,2]$  is \_\_\_\_\_.

A. 1

B. 0

C. 2

D. -1

Ans: B

3.

The Laplace Transform of  $f(t) = e^{2t} \sin(5t)u(t)$  is

(A)  $\frac{5}{s^2 - 4s + 29}$

(B)  $\frac{5}{s^2 + 5}$

(C)  $\frac{s-2}{s^2 - 4s + 29}$

(D)  $\frac{5}{s+5}$

Key: (A)

4.

A function  $y(t)$ , such that  $y(0) = 1$  and  $y(1) = 3e^{-1}$ , is a solution of the differential equation

$$\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = 0. \text{ Then } y(2) \text{ is}$$

- (A)  $5e^{-1}$                       (B)  $5e^{-2}$                       (C)  $7e^{-1}$                       (D)  $7e^{-2}$

Key: (B)

5.

Consider a continuous-time system with input  $x(t)$  and output  $y(t)$  given by

$$y(t) = x(t) \cos(t). \text{ This system is}$$

- (A) linear and time-invariant                      (B) Non-linear and time-invariant  
(C) linear and time-varying                      (D) Non-linear and time-varying

Key: (C)

6.

In cylindrical coordinate system, the potential produced by a uniform ring charge is given  $\phi = f(r, z)$ , where  $f$  is a continuous function of  $r$  and  $z$ . Let  $\vec{E}$  be the resulting electric field. Then the magnitude of  $\nabla \times \vec{E}$

- (A) increases with  $r$                       (B) is 0  
(C) is 3                      (D) decreases with  $z$

Key. (B)

7. In a constant V/f induction motor drive, the slip at the maximum torque

- (A) is directly proportional to the synchronous speed  
(B) remains constant with respect to the synchronous speed  
(C) has an inverse relation with the synchronous speed  
(D) has no relation with the synchronous speed

Key: (C)

8. In a 100bus power system, there are 10 generators. In a particular iteration of Newton Raphson load flow technique (in polar coordinates). Two of the PV buses are converted to PQ type. In this iteration

(A) The number of unknown voltage angles increases by two and the number of unknown voltage magnitudes increases by two.

(B) The number of unknown voltage angles remain unchanged and the number of unknown voltage magnitudes increases by two

(C) The number of unknown voltage angles increases by two and the number of unknown voltage magnitudes decreases by two

(D) The number of unknown voltage angles remains unchanged and the number of unknown voltage magnitudes decreases by two

Key: (B)

9. Consider a system consisting of a synchronous generator working at a lagging power factor, a synchronous motor working at an overexcited condition and a directly grid-connected induction generator. Consider capacitive VAR to be a source and inductive VAR to be a sink of reactive power. Which one of the following statements is TRUE?

(A) Synchronous motor and synchronous generator are sources and induction generator is a sink of reactive power.

(B) Synchronous motor and induction generator are sources and synchronous generator is a sink of reactive power.

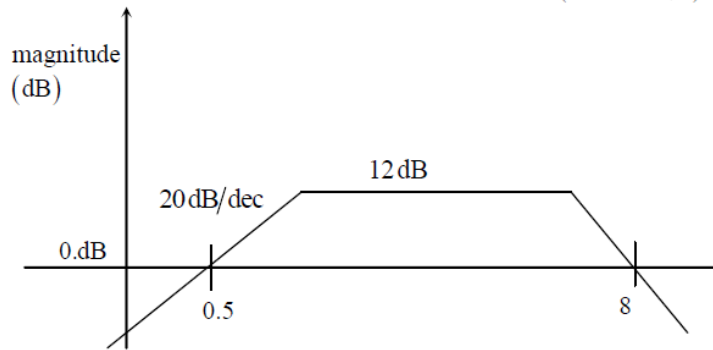
(C) Synchronous motor is a source and induction generator and synchronous generator are sinks of reactive power

(D) All are sources of reactive power

Key: (A)

10.

Consider the following asymptotic Bode magnitude plot ( $\omega$  is in rad/s).



Which one of the following transfer function is best represented by the above Bode magnitude plot?

(A)  $\frac{2s}{(1+0.5s)(1+0.25s)^2}$

(B)  $\frac{4(1+0.5s)}{s(1+0.25s)}$

(C)  $\frac{2s}{(1+2s)(1+4s)}$

(D)  $\frac{4s}{(1+2s)(1+4s)^2}$

Key: (A)

11.

Loop transfer function of a feedback system is  $G(s)H(s) = \frac{s+3}{s^2(s-3)}$ . Take the Nyquist contour in the clockwise direction. Then the Nyquist plot of  $G(s)H(s)$  encircles  $-1 + j0$

(A) Once in clockwise direction

(B) Twice in clockwise direction

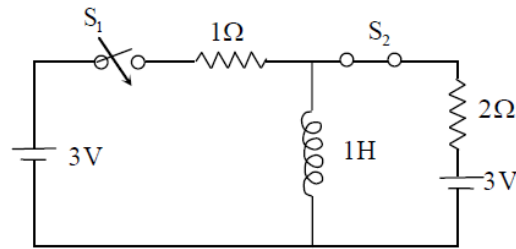
(C) Once in anticlockwise direction

(D) Twice in anticlockwise direction

Key: (A)

12.

In the circuit shown, switch  $S_2$  has been closed for a long time. At time  $t = 0$  switch  $S_1$  is closed. At  $t = 0^+$ , the rate of change of current through the inductor, in amperes per second, is \_\_\_\_\_.



A. 1

B. 4

C. 2

D. 6.5

Ans: C

13.

A single-phase thyristor-bridge rectifier is fed from a 230V, 50Hz, single-phase, AC mains. If it is delivering a constant DC current 10A, at firing angle of  $30^\circ$ , then value of the power factor at AC mains is

(A) 0.87

(B) 0.9

(C) 0.78

(D) 0.45

Ans: C

14. A single-phase full-bridge voltage source inverter (VSI) is fed from a 300 V battery. A pulse of  $120^\circ$  duration is used to trigger the appropriate devices in each half-cycle. The rms value of the fundamental component of the output voltage, in volts, is

(A) 234

(B) 245

(C) 300

(D) 331

Key: (A)

15.

The output expression for the Karnaugh map shown below is

(A)  $A + \bar{B}$

(B)  $A + \bar{C}$

(C)  $\bar{A} + \bar{C}$

(D)  $\bar{A} + C$

		BC			
		00	01	11	10
A	0	1	0	0	1
	1	1	1	1	1

Key: B

16.

A  $3 \times 3$  matrix P is such that,  $P^3 = P$ . Then the eigenvalues of P are

(A) 1, 1, -1

(B)  $1, 0.5 + j0.866, 0.5 - j0.866$

(C)  $1, -0.5 + j0.866, 0.5 - j0.866$

(D) 0, 1, -1

Key: (D)

17.

The value of the line integral  $\int_C (2xy^2 dx + 2x^2 y dy + dz)$  along a path joining the origin (0,0,0) and the point (1,1,1) is

(A) 0

(B) 2

(C) 4

(D) 6

Key: (B)

18.

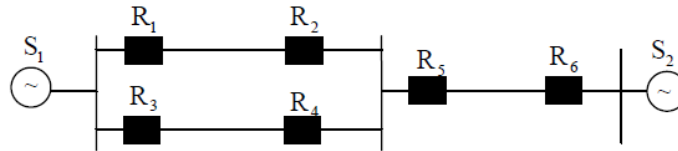
Let  $f(x)$  be a real, periodic function satisfying  $f(-x) = -f(x)$ . The general form of its Fourier series representation would be

- (A)  $f(x) = a_0 + \sum_{k=1}^{\infty} a_k \cos(kx)$                       (B)  $f(x) = \sum_{k=1}^{\infty} b_k \sin(kx)$   
(C)  $f(x) = a_0 + \sum_{k=1}^{\infty} a_{2k} \cos(kx)$               (D)  $f(x) = \sum_{k=1}^{\infty} a_{2k+1} \sin(2k+1)x$

Key: (B)

19.

A power system with two generators is shown in the figure below. The system (generators, buses and transmission lines) is protected by six overcurrent relays  $R_1$  to  $R_6$ . Assuming a mix of directional and nondirectional relays at appropriate locations, the remote backup relays for  $R_4$  are



- (A)  $R_1, R_2$                       (B)  $R_2, R_6$                       (C)  $R_2, R_5$                       (D)  $R_1, R_6$

Key: (D)

20. A power system has 100 buses including 10 generator buses. For the load flow analysis using Newton-Raphson method in polar coordinates, the size of the Jacobian is

- (A)  $189 \times 189$   
(B)  $100 \times 100$   
(C)  $90 \times 90$   
(D)  $180 \times 180$

Key: (A)

21. The capacitance of a conducting sphere of radius  $r$  with a total charge of  $q$  uniformly distributed on its surface is

- (a) proportional to  $qr$
- (b) independent of  $r$
- (c) proportional to  $q/r$
- (d) independent of  $q$

Ans. (d)

22. The characteristic impedance of a transmission line depends upon

- (a) shape of the conductor
- (b) surface treatment of the conductor
- (c) conductivity of the material
- (d) geometric configuration of the conductor

Ans. (d)

23. In a series R-L-C circuit supplied by a source of 125 V at a resonant frequency of 220 Hz, the magnitudes of the voltages across the capacitor and the inductor are found to be 4150 V. If the resistance of the circuit is  $1\Omega$ , then the selectivity of the circuit is

- (a) 33.20
- (b) 3.32
- (c) 0.0301
- (d) 0.301



Ans : a

24. The magnitude of magnetic field strength  $H$  is independent of

- (a) current only
- (b) distance only
- (c) permeability of the medium only
- (d) both current and distance

Ans. (c)

25. Consider the following types of transmission lines:

1. Open-wire line
2. Twin-lead wire
3. Coaxial cable

The capacitance per metre will be least in which of the above transmission lines?

- (a) 1 only                      (b) 2 only
- (c) 3 only                      (d) 1, 2 and 3

Ans. (a)

26. The conductivity of insulating materials (a very small value) is called as .

- (a) residual conductivity      (b) dielectric conductivity
- (c) ionic conductivity          (d) bipolar conductivity

Ans. (b)

27. A single-phase full-wave rectifier is constructed using thyristors. If the peak value of the sinusoidal input voltage is  $V_m$  and the delay angle is  $(\pi / 3)$  radian, then the average value of output voltage is

- (a)  $0.32 V_m$                       (b)  $0.48 V_m$   
(c)  $0.54 V_m$                       (d)  $0.71 V_m$

Ans. (a)

28. Two bulbs of  $100 \text{ W} / 250 \text{ V}$  and  $150 \text{ W} / 250 \text{ V}$  are connected in series across a supply of  $250 \text{ V}$ . The power consumed by the circuit is

- (a)  $30 \text{ W}$                               (b)  $60 \text{ W}$   
(c)  $100 \text{ W}$                             (d)  $250 \text{ W}$

Ans. (b)

29. Analog-to-digital converter with the minimum number of bits that will convert analog input signals in the range of  $0\text{-}5 \text{ V}$  to an accuracy of  $10 \text{ mV}$  is

- (a) 6  
(b) 9  
(c) 12  
(d) 15

Ans: b

30. A CRO screen has 10 divisions on the horizontal scale. If a voltage signal  $5 \sin (314 t + 45^\circ)$  is examined with a line base setting of 5 ms/div, the number of signals displayed on the screen will be

- (a) 1.25 cycles
- (b) 2.5 cycles
- (c) 5 cycles
- (d) 10 cycles

Ans. (b)

31. The degree to which an instrument indicates the changes in measured variable without dynamic error is

- (a) repeatability
- (b) hysteresis
- (c) precision
- (d) fidelity

Ans. (d)

32. A three-phase diode bridge rectifier is feeding a constant DC current of 100A to a highly inductive load. If three-phase, 415V, 50Hz AC source is supplying to this bridge rectifier then the rms value of the current in each diode, in ampere, is \_\_\_\_\_.

- A. 33.56
- B. 15.98
- C. 57.73
- D. 25.43

Ans: C

33. The direction of rotation of a single-phase capacitor run induction motor is reversed by

- (A) interchanging the terminals of the AC supply
- (B) interchanging the terminals of the capacitor
- (C) interchanging the terminals of the auxiliary winding.
- (D) interchanging the terminals of both the windings

Key: (C)

34. The graph associated with an electrical network has 7 branches and 5 nodes. The number of independent KCL equations and the number of independent KVL equations, respectively, are

- (A) 2 and 5
- (B) 5 and 2
- (C) 3 and 4
- (D) 4 and 3

Key: (D)

35.

The Boolean expression  $\overline{(\bar{a} + \bar{b} + c + \bar{d}) + (b + \bar{c})}$  simplifies to

- (A) 1                      (B)  $\bar{a}.\bar{b}$                       (C) a.b                      (D) 0

Key: (D)

36.

The value of the integral  $2 \int_{-\infty}^{\infty} \left( \frac{\sin 2\pi t}{\pi t} \right) dt$  is equal to

- (A) 0                                      (B) 0.5                                      (C) 1                                      (D) 2

Key: (D)

37. At no load condition a 3-phase, 50Hz, lossless power transmission line has sending –end and receiving-end voltage of 400 kV and 420kV respectively. Assuming the velocity of travelling wave to be the velocity of light, the length of the line, in km, is \_\_\_\_\_.

- A. 105  
B.294.84  
C. 278.57  
D. 350

Key: B

38.

Three single-phase transformers are connected to form a delta-star three-phase transformer of 110kV/11kV. The transformer supplies at 11kV a load of 8MW at 0.8 p.f. lagging to a nearby plant. Neglect the transformer losses. The ratio of phase current in delta side to star side is

- (A)  $1:10\sqrt{3}$                                       (B)  $10\sqrt{3}:1$                                       (C) 1:10                                      (D)  $\sqrt{3}:10$

Ans: A

39. An energy meter, having meter constant of 1200 revolutions makes 20 revolutions in 30 seconds for a constant load. The load, in kW is \_\_\_\_\_

- A. 1

B.2

C.3

D.4

Ans: B

40. The maximum space rate of change of the function which is in increasing direction of the function is known as

- (A) curl of the vector function
- (B) gradient of the scalar function
- (C) divergence of the vector function
- (D) Stokes theorem

Key: (B)

41. For electromechanical energy conversion, a magnetic field is employed as the medium rather than electric field because

- (A) the stored energy density for practicable field strength is low in the electric field
- (B) the electric field presents insulation problem.
- (C) the specific magnetic loss is more than the specific dielectric loss
- (D) None of the above

Key: ( A)

42. The law which states that the line integral of the magnetic field around a closed curve is equal to the free current through a surface, is

- (A) Gauss' law
- (B) Tellegen's theorem
- (C) Coulomb's law
- (D) Ampere's law

Key: (D)

43. The skin effect in a transmission line is affected by

- (A) the resistivity of the transmission line
- (B) the current magnitude in the transmission line
- (C) the cross-sectional area of the transmission line
- (D) the voltage applied across the transmission line

Key: (D)

44. The problems of the binary-weighted resistor digital-to-analog converter (DAC) can be overcome by using

- (A) an 8-bit binary-weighted resistor DAC
- (B) A flash DAC
- (C) An R/2R ladder DAC
- (D) A staircase DAC

Key: (C)

45. The temperature above which an anti-ferromagnetic material becomes paramagnetic is called

- (A) peak temperature
- (B) Neel temperature
- (C) critical temperature
- (D) Weiss temperature

Key: (B)

46. Magnetic materials which may be readily magnetized in either direction are

- (A) soft magnetic materials
- (B) hard magnetic materials
- (C) high eddy current loss materials
- (D) high hysteresis loss materials

Key: (A)

47. An iron-cored coil has an equivalent resistance of  $5 \Omega$ . It draws 10 A when the applied voltage is 240 V, 50 Hz. Its inductance and power factor respectively are

- (A) 7.5 mH and 0.1 (lag)
- (B) 74.7 mH and 0.1 (lag)
- (C) 74.7 mH and 0.208 (lag)
- (D) 7.5 mH and 0.208 (lag)

Key: (C)



48. An a.c. source 200V r.m.s supplies an active power of 1200W and a reactive power of 1600 VAR to a load. The r.m.s current and the power factor of the load respectively are

(A) 10A and 0.6

(B) 8A and 0.8

(C) 10A and 0.8

(D) 8A and 0.6

Key: (A)

49. None of the poles of a linear control system lies in the right-half of s-plane. For a bounded input, the output of this system

(A) is always bounded

(B) could be unbounded

(C) always tends to zero

(D) None of the above

Key: (A)

50. If the diameter of copper wire is increased by two times keeping its terminal voltage same, then the drift velocity will

(A) become twice

(B) become half

(C) become four times

(D) remain unchanged

Key: (D)

51. Phase lead compensation

- (A) Increases bandwidth and increases steady-state error
- (B) decreases bandwidth and decreases steady-state error
- (C) will not affect bandwidth but decreases steady-state error
- (D) increases bandwidth but will not affect steady-state error

Key: (D)

52. The theorem which states that in any linear, non-linear, passive, active, time variant and time-variant network, the summation of instantaneous powers is zero will be called as

- (A) Tellegen's theorem
- (B) Compensation theorem
- (C) reciprocity theorem
- (D) superposition theorem

Key: (A)

53. Transients are caused because

1. The load is suddenly connected to or disconnected from the supply
2. of the sudden change in applied voltage from one finite value to the other
3. of the change in stored energy in inductors and capacitors

Which of the above statements are correct?

- (A) 1 and 2 only (B) 1 and 3 only
- (C) 2 and 3 only (D) 1, 2 and 3

Key: (D)

54. The derivative of a parabolic function becomes

- (A) a unit-impulse function
- (B) a ramp function
- (C) a gate function
- (D) a triangular function

Key: (B)

55. Which of the following can produce maximum induced voltage?

- (A) 1 A d.c. current
- (B) 50 A d.c. current
- (C) 1 A, 60 Hz a.c. current
- (D) 1A, 490 Hz a.c. current

Ans: D

56. If the Q-factor of a coil at resonant frequency of 1.5 MHz is 150 for a series resonant

circuit, then the corresponding bandwidth is

- (A) 225 MHz
- (B) 1.06 MHz
- (C) 50 kHz
- (D) 10 kHz

Key: (D)

57. A pair of high-frequency parallel transmission lines has distributed capacitance and inductance of  $0.8\mu\text{F}$  and  $9.8\text{ mH}$  respectively. What is the characteristics impedance of the line?

(A)  $98.26\ \Omega$

(B)  $110.68\ \Omega$

(C)  $125\ \Omega$

(D)  $128.2\ \Omega$

Key: (B)

58.

A one-part network consists of a capacitor of  $2\text{F}$  in parallel with a resistor of  $\frac{1}{3}\ \Omega$ . Then the input admittance is

(A)  $2s + 3$

(B)  $3s + 2$

(C)  $\frac{2}{s} + \frac{1}{3}$

(D)  $\frac{s}{2} + 3$

Key: (A)

59. The servomotor differs from the standard motors principally in that, it has

(A) entirely different construction

(B) high inertia and hence high torque

(C) low inertia and low torque

(D) low inertia and higher starting torque

Key: (D)

60.

The vector  $\begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}$  is an eigenvalue of  $A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$

One of the eigenvalues of A is

- (A) 1                      (B) 1                      (C) 5                      (D) 7

Key: (B)

61.

In an electric circuit, the number of independent meshes M is

- (A)  $2B - N + 1$       (B)  $B - N + 1$       (C)  $2B - N - 1$       (D)  $B - N - 1$

Where B is number of branches and N is number of nodes.

Key: (B)

62. Frequency counter can be used to measure

1. Fundamental frequency of input signal
2. Fundamental and harmonic frequencies of input signal
3. Time interval between two pulses
4. Pulse width

Which of the above statements are correct?

- (A) 1, 2, 3 and 4 (B) 1, 2 and 3 only  
(C) 2, 3 and 4 only (D) 1, 3 and 4 only

Key: (D)

63. The maximum power demand of a consumer is 2 kW and the corresponding daily energy consumption is 30 units. What is corresponding load factor?

- (A) 0.25
- (B) 0.5
- (C) 0.625
- (D) 0.75

Key: (C)

64. Time response of an indicating instrument is decided by which of the following systems?

- (A) Mechanical system provided by pivot and jewel bearing
- (B) Controlling system
- (C) Deflecting system
- (D) Damping system

Key: (D)

65. What happens to the resistance of a conductor if its length is increased three times and diameter is halved?

- (A) Resistance remains the same
- (B) Resistance is increased 3 times
- (C) Resistance is increased 6 times
- (D) Resistance is increased 12 times

Key: (D)

66. In measuring resistance by voltmeter ammeter method, the voltmeter can be connected either across supply or across the resistance. If the resistance is low, the voltmeter should be connected

- (A) across the supply
- (B) across the resistance
- (C) either across the supply or across the resistance
- (D) neither across the supply nor across the resistance

Key: ( B)

67. A bridge circuit works at a frequency of 2 kHz. Which of the following can be used as detectors for detection of null conditions in the bridge?

- (A) Vibrations galvanometers and head phones
- (B) Headphones and tuneable amplifiers
- (C) Vibrations galvanometers and tuneable amplifiers
- (D) Vibration galvanometers, head phones and tuneable amplifiers

Key: (B)

68. A dual-beam CRO

- (A) has one set of vertical deflection plates
- (B) has two sets of horizontal deflection plates
- (C) has two separate electron beams
- (D) None of the above

Key: (C)

69. If the bandwidth of an oscilloscope is 10 MHz, what is fastest rise time a square wave can have to be accurately reproduced by the instrument?

- (A) 10 ns
- (B) 35 ns
- (C) 28 ns
- (D) 100 ns

Key: (B)

70. A Wheatstone bridge has got three resistances taken in clockwise direction as 120Ω, 150Ω and 150Ω. The value of the fourth resistance for null balance would be

- (A) 150Ω
- (B) 120Ω
- (C) 300Ω
- (D) 750Ω

Key: (B)

71.

A unity feedback system has open-loop transfer function

$$G(s) = \frac{K(s+4)}{(s+1)(s+2)}$$

The portions of the real axis that lie on the root loci are between

- (A)  $s = -2$  and  $s = -4$ ;  $s = -1$  and  $+\infty$
- (B)  $s = -1$  and  $s = -2$ ;  $s = -4$  and  $-\infty$
- (C)  $s = 0$  and  $s = -2$ ; beyond  $s = -4$
- (D)  $S = 0$  and  $s = -1$



Key: (B)

72. Consider the following statements with respect to Routh-Hurwitz criterion

1. It can be used to determine relative stability
2. It is valid only for real coefficients of the characteristic equation
3. It is applicable only for non-linear systems
4. It does not provide the exact location of closed-loop poles in left-or right-half of s-plane.

Which of the above statements are correct?

- (A) 1, 2 and 3 only
- (B) 3 and 4 only
- (C) 1, 2 and 4 only
- (D) 1, 2, 3 and 4

Key: (C)

73. A 250 kVA, 11000V/400V and 50 Hz single-phase transformer has 80 turns on the secondary, what is the maximum value of flux?

- (A) 2475 mWb
- (B) 0.2 mWb
- (C) 22.5 mWb
- (D) 55.2 mWb

Key: (C)

74. In a normal operation of 400V, 50 Hz transformer, the total iron loss is 2500W. When the supply voltage and frequency are reduced to 200V and 25 Hz respectively, the corresponding loss is 850W. The eddy-current loss at normal voltage and frequency is

- (A) 400W

- (B) 800W
- (C) 1600W
- (D) 200W

Key: (C)

75.

A magnetic circuit has 150 turns-coil, the cross-sectional area  $5 \times 10^{-4} \text{m}^2$  and the length of the magnetic circuit  $25 \times 10^{-2} \text{m}$ . What are the values of magnetic field intensity and relative permeability when the current is 2A and total flux is  $0.3 \times 10^{-3} \text{Wb}$ ?

- (A) 1200 AT/m and 397.9
- (B) 300 AT/m and  $500 \times 10^{-6}$
- (C) 300 AT/m and 397.9
- (D) 1200 AT/m and  $500 \times 10^{-6}$

Key: (A)

76. The percentage resistance and reactance of a transformer are 2% and 4% respectively. The approximate regulation on full load at 0.8 pf lag is

- (A) 12%
- (B) 8%
- (C) 6%
- (D) 4%

Key: (D)

77. A 3-phase transformer has 420 and 36 turns on the primary and secondary windings respectively. The supply voltage is 3300V. The secondary line voltage on no-load when the windings are connected in star-delta is nearly

- (A) 22260V
- (B) 1908V

(C) 164V

(D) 490V

Key: (C)

78. In dc machines, the field-flux axis and armature-mmfm axis are respectively along

(A) Direct axis and indirect axis

(B) Direct axis and inter-polar axis

(C) Quadrature axis and direct axis

(D) Quadrature axis and inter-polar axis

Key: (B)

79. The speed control of dc shunt motor in both directions can be obtained by

(A) Armature resistance control method

(B) Ward Leonard method

(C) Field diverter method

(D) Armature voltage control method

Key: (B)

80. In an L-section filter, a bleeder resistance connected across the load

(A) Provides good regulation for all values of load

(B) Ensures lower PIV of the diodes

(C) Ensures lower values of capacitance in the filter

(D) Reduces ripple content

Key: (D)

81. The power output from a hydro-electric power plant depends on

(A) Head, type of dam and discharge

(B) Head, discharge and efficiency of the system

(C) Type of draft tube, type of turbine and efficiency of the system

(D) Type of dam, discharge and type of catchment area

Key: (B)

82. In case of single line to ground fault

(A) All sequence networks are connected in parallel

(B) All sequence networks are connected in series

(C) Positive and negative sequence networks are connected in parallel

(D) Zero and negative sequence networks are connected in series

Key: (B)

83. What is the region of operation of a 3-phase inverter employing sinusoidal PWM when the peak-to-peak values of both the carrier and the modulating waves are made equal?

(A) Linear modulation

(B) Over modulation

(C) Boundary of linear modulation and over modulation

(D) Six-step operation

Key: (D)

84. Modified McMurray full-bridge inverter works on

(A) Voltage commutation

(B) Current commutation

(C) Load commutation

(D) Complementary commutation

Key: (A)

85. Ripple-rejection ratio of voltage regulator is the ratio of

(A) Output voltage to input ripple voltage

(B) Output power to input power of regulator

(C) Input power to output power of regulator

(D) Input ripple voltage to output ripple voltage

Key: (D)

86. A self-starting counter is one that can start

(A) The sequence from initial count and continues its sequence

(B) The sequence from any state among the sequence and continues its normal count sequence

(C) From any state but eventually reaches the required count sequence

(D) None of the above

Key: (C)

87. When a program is being executed in an 8085 microprocessor, its program counter contains

- (A) The memory address as the instruction that is to be executed next
- (B) The memory address of the instruction that is being currently matched
- (C) The total number of instructions in the program being executed
- (D) The number of instructions in the current program that have already been executed

Key: (A)

88. Race-around condition occurs in

- (A) Multiplexer
- (B) ROM
- (C) Flip-flops
- (D) Voltage regulator

Key: (C)

89. Which one of the following is used for serial I/O transfer in 8085 based system?

- (A) 8251
- (B) 8255
- (C) 8259
- (D) 8279

Key: (B)

90. Digital modulation techniques are used in satellite communication system, because

- (A) They are easier to handle
- (B) Large bandwidth utilization is possible
- (C) They have a spectral efficiency
- (D) They are less prone to interference

Key: (D)

91. In FM modulation, when the modulation index increases, the transmitted power is

- (A) Increased
- (B) Decreased
- (C) Unchanged
- (D) Not related

Key: (C)

92. In TV, Video signals are transmitted through

- (A) Amplitude modulation
- (B) Frequency modulation
- (C) Either amplitude or frequency modulation
- (D) Neither amplitude nor frequency modulation

Key: (D)

93. If the number of bits per sample in a PCM system is increased from 8 to 16, then the bandwidth will be increased by

- (A) 2 times
- (B) 4 times
- (C) 8 times
- (D) 16 times

Key: (C)

94. The frequency of ripple in the output voltage of a three phase controlled bridge rectifier depends on

- (A) Firing angle
- (B) Load inductance
- (C) Load resistance
- (D) Supply frequency

Key: (D)

95. Consider the following statements about IGBT

- (A) It has high input impedance
- (B) It has low ON state voltage drop
- (C) Its switching speed is higher than that of the MOSFET
- (D) It is a voltage controlled device

Which of the above statements are correct?

- (A) 1, 2 and 3 only



(B) 2, 3 and 4 only

(C) 1, 2 and 4 only

(D) 1, 2, 3 and 4

Key: (C)

96. It is required to control the speed and braking operation of a dc shunt motor in both the directions of rotation. The most suitable power electronic circuit will be

(A) A half-controlled converter

(B) A fully-controlled converter

(C) A diode-bridge converter

(D) A dual converter

Key: (D)

97. How can the 3rd harmonic current be filtered in Thyristor-controlled reactor?

(A) By connecting in delta

(B) By connecting in star

(C) By connecting in star-delta

(D) none of the above

Key: (A)

98. A voltage source inverter is used when source and load inductances are respectively

(A) Small and large

(B) Large and small

(C) Large and large

(D) Small and small

Key: (A)

99. With negative feedback, the system stability and system gain respectively

(A) Increases and increases

(B) Increases and decreases

(C) Decreases and increases

(D) Decreases and decreases

Key: (B)

100. The state equations in the phase variable canonical form can be obtained from the transfer function by

(A) Cascade decomposition

(B) Direct decomposition

(C) Inverse decomposition

(D) Parallel decomposition

Key: (B)