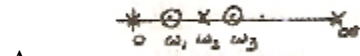# Electronics-Engineering

1. Match List-I with List-II and select the correct answer using the codes given below the lists :
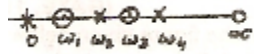
   List-I
   (Pole-zero configurations)

   List-II
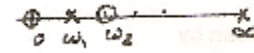   (Number of elements in Foster's first form Network)

   A.
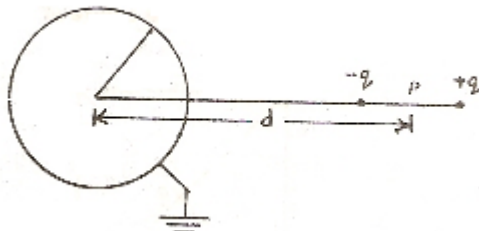
   B.

   C.

   D.

   1. Two

   2. Three

   3. Four

   4. Five

   Codes:

	A	B	C	D
A.	3	2	1	4
B.	4	3	1	2
C.	3	4	2	1
D.	2	1	4	3

2. An electric dipole of moment P is placed in front of a grounded sphere as shown in the fig. The charge induced on the surface of the sphere is:

   A. zero

   B. PR / d^2

   C. PR^2 / d^3

   D. PR^3 / d^4

3. A power MOSFET is a

   A. voltage controlled device

   B. current controlled device

   C. frequency controlled device

   D. none of the above

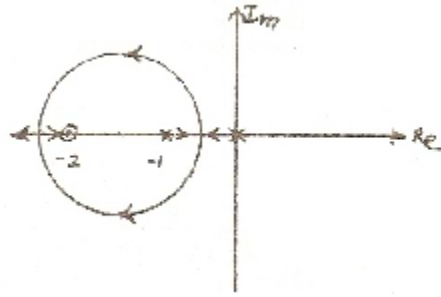4. Megger is an instrument for

   A. measuring current

   B. measuring voltage

   C. testing insulation

   D. measuring power

5.

The root locus of a unity feedback system is shown in the above figure. The open-loop transfer function is given by:

A. $\dfrac{K}{s(s+1)(s+2)}$

B. $\dfrac{K(s+1)}{s(s+2)}$

C. $\dfrac{K(s+2)}{s(s+1)}$

D. $\dfrac{Ks}{(s+1)(s+2)}$

6. An excess-3 code is used to represent the integers 0 through 9, thus:

Number	Code (ABCD)
0	1100
1	0010
2	1010
3	0110
4	1110
5	0001
6	1001
7	0101
8	1101
9	0011

Which of the following expressions is the correct one for an invalid code?

A. $\bar{B}.\bar{C}.\bar{D}. + CD$

B. B. C. D. + A. C. D.

C. $\bar{B}.\bar{C}.\bar{D}.+B.C.D.+A.C.D.+\bar{A}.\bar{C}.\bar{D}.$

D. $\bar{B}.\bar{C}.\bar{D}.+A.C.D.$

7. An amplifier has a bandwidth of 20 kHz and a midband gain of 50 without feedback. If a negative feedback of 1% is applied, then bandwidth with feedback is

A. 13.3 kHz

B. 30 kHz

C. 10 kHz

D. 40 kHz.

8. The critical frequency of an ionospheric layer during the day time is

A. more than

B. less than

C. same as for night time

D. None of the above.

9. The data bus in 8080A / 8085 microprocessor is a group of

A. Eight bidirectional lines that are used to transfer 8 bits between the microprocessor and its I / O and memory.

B. Eight lines used to transfer data among the registers

C. Eight unidirectional lines that are used for I / O devices.

D. Sixteen bidirectional lines that are used for data transfer between the microprocessor and memory

10. "The ratio of thermal conductivity to electrical conductivity of a metal M decreases at low temperatures and the value tends to be zero at zero degree Kelvin".

From the above statement, it can be concluded that

A. Thermal conductivity of metal M is constant

B. Electrical conductivity of metal varies with temperature only

C. At absolute zero thermal conductivity of M is zero

D. At absolute zero the electrical conductivity of metal M is infinitely large?

11. Which of the following expression states Gibb's phase rule (where the notations have their usual meaning?)

A. $F = C - P + 1$

B. $F = C - P + 2$

C. $F = C - P + 3$

D. $F = C - P + 4$.

12. In horizontal scanning in TV receiver, the beam starts from

A. left top corner and moves to the right

B. centre of top of the frame and moves to right

C. centre of the bottom of the frame and move to the right

D. right top corner of the frame and moves to the right

13. The equipment used for measuring the height of the aero plane for ground is called

A. MTI

B. Pulse radar

C. Radar altimeter

D. CW radar.

14. A reflex Klystron functions as

A. microwave amplifier

B. microwave oscillator

C. a high gain cavity

D. both as amplifier and as oscillator

15. The effect of noise in a communication system is most adverse with reference to
    A. Channel
    B. Encoder
    C. Source
    D. Receiver

16. In the circuit shown in the given figure, the switch S is open for a long time and closed at t = 0.
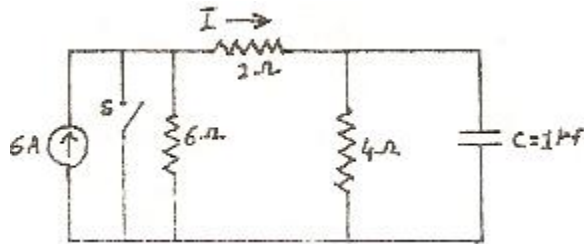
The value of I at $t = 0^+$ is
    A. -6 A
    B. -3/2 A
    C. 3 A
    D. 9/2 A

17. A slab of uniform magnetic field deflects a moving charged particle by 45° as shown in the figure. The kinetic energy of the charged particle at the entry and exit points in the magnetic field will change in the ratio of
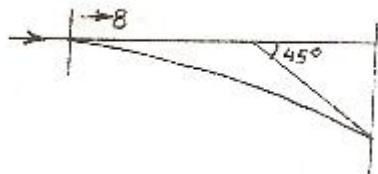
    A. $1 : \sqrt{2}$
    B. $\sqrt{2} : 1$
    C. $1 : 1$
    D. $1 : 2$

18. A power MOSFET is a
    A. current controlled device
    B. voltage controlled device
    C. both current and voltage controlled device
    D. none of the above

19. The instrument whose deflection is given by the expression $\theta \propto I^2 \, dm / d\theta$ is known is
    A. electrodynamics type
    B. repulsion type

C. electrostatic type

D. attraction type

20. The open loop transfer function of a unity feedback control system is given by :

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

It the gain K is increased to infinity, then the damping ratio will tend to become:

A. $1/\sqrt{2}$

B. 1

C. 0

D. ∞

21. Maximum I / 0 spaces which can be addressed by 8088 CPU is

A. 1024

B. 2048

C. 65536

D. 2000.

22.

Statement-I	Statement - II
Theoretical efficiency of Class-A Power amplifier is 78%	A single-ended power amplifier uses one Transistor only

Key:

A. Statement I is correct but II is wrong

B. Statement 2 is correct but I is wrong

C. Both statements I and II are correct

D. Neither statement I nor II is correct.

23. How many loud speakers are required in a quadraphonic?

A. Two

B. Three

C. Four

D. Six

24. The stack pointer in the 8085 microprocessor is a

A. 16 bit registers that point to stack memory locations

B. 16 bit accumulator

C. memory location in the stack

D. flag register used for the stack.

25. Which of the following UHF?

A. 40 GHz

B. 400 MHz

C. 400 kHz

D. 1680 MHz.

26. Gunmetal is an alloy of

A. 80% Cu + 15% Zn + 5% Sn

B. 86% Cu + 9% Zn + 5% Sn

C. 88% Cu + 2% Zn + 10% Sn

D. 70% Cu + 10% Zn + 20% Sn

27. Number of picture frames displayed per second in TV as per CCIR B-system is

A. 16

B. 25

C. 50

D. 60.

28. An ideal pulse radar receiver

A. should have a very large BW

B. should not have a very large BW

C. should have a small BW

D. none of the above

29. Klystron operates on the principle of

A. amplitude modulation

B. frequency modulation

C. pulse modulation

D. velocity modulation

30. A satellite of low circular orbit than a geostationary orbit is known as

A. Passive satellite

B. Active satellite

C. Fast moving satellite

D. Slow moving satellite.

31. The Laplace transform of the following voltage waveform is

A. $\dfrac{V_0}{T_s^2} + \dfrac{V_0}{T_s^2} e^{-sT} >$

B. $\dfrac{V_0}{T_s^2} - \dfrac{V_0}{T_s^2} e^{-sT}$

C. $\dfrac{V_0}{T_s^2} - \dfrac{V_0}{T_s} e^{-sT}$

D. $\dfrac{V_0}{T_s^2} - \dfrac{V_0}{T_s^2} e^{-sT(1+sT)}$

32. In the above figure, the force acting on the conductor PQ is in the direction of
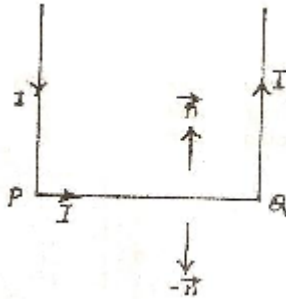
A. PQ

B. PQ

C. -n

D. n

33. The major application of chopper drive is in

A. traction

B. computers

C. heating furnaces

D. miniature motors

34. The following error does not result in moving iron instrument with both d.c. and a.c.:

A. stray magnetic field error

B. hysteresis error

C. eddy current error

D. temperature error

35. The characteristic equation of a unity feedback control system is given by $s^3 + K_1s^2 + s + K_2 = 0$ Consider the following statements in this regard:

1. For a given of K_1, all the root-locus branches will terminate at infinity for K_2 in the positive direction.

2. For a given value of K_2, all the root-locus branches will terminate at infinity for variable K_1 in the positive direction.

3. For a given value of K_2, only one root-locus branch will terminate at infinity for variable K_1 in the positive direction.

Of these statements:

A. 1 and 2 are correct

B. 3 alone is correct

C. 2 alone is correct

D. 1 and 3 are correct.

36. The widely used code in data communication is

A. 8 bit ASCII

B. 7 bit ASCII

C. EBCDIC

D. None of the above.

37. An amplifier is used to amplify a 30π Hz square wave with a sag not exceeding I%. Maximum permissible lower 3 dB frequency of the amplifier in Hz is

A. 30

B. 300

C. 0.3π

D. 100

38.   A communication channel disturbed by additive white Gaussian noise has a bandwidth of 4 KHz and SNR of 15. The highest transmission rate that such a channel can support (in K-nits / sec)

A. 16

B. 1.6

C. 32

D. 60

39.   How many address lines are needed to address each memory location in a 2048 $\times$ 4 memory chip?

A. 10

B. 11

C. 8

D. 12

40.   Varactor is a

A. non-linear resistor

B. variable resistor

C. non-linear capacitor

D. non-linear inductor

41.   Silicon steel used for electrical purposes has silicon percentage of

A. 0.5%

B. 2.5%

C. 3.4%

D. 12.5%

42.   To eliminate ghosts in the picture we may

A. use a longer transmission line

B. twist the transmission line

C. connect a booster

D. change the antenna orientation or location

43.   The COHO in MTI radar operates as the

A. Intermediate frequency

B. Transmitted frequency

C. Received frequency

D. Pulse repetition frequency.

44.   The transit time in the repeller space of a reflex Klystron must be

A. n cycles

B. n + ¼ cycles

C. n + 3 / 4 cycles

D. n + ½ cycles

45.   Orbit height, H for a satellite is given by

A. H = (r km - 6370) km

B. H = (r km + 6370) km

C. H = r km

D. none of the above

46.   A DOC formatted Hard Disk has following parameters

No. of Cylinders = 1000

No. of Heads   = 5

17 sectors per cylinder

What is the total Disk Capacity?

A. 10 MB

B. 32 MB

C. 85 MB

D. 42.5 MB

47.
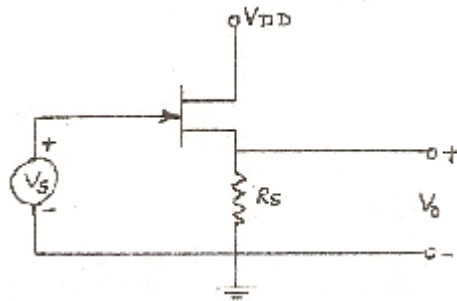
$R_s = 3 \text{ K.}$ Given V_0 / V_s = 0.9,

The value of g_m is given by

A. 0.3 mA / V

B. 0.33 mA / V

C. 3.0 mA / V

D. 3.0 A / V.

48.   PGM systems require regenerative repeaters over long distances. The correct sequence of the operations which such a repeater performs is

A. Timing, equalization and decision making

B. Equalization, timing and decision making

C. Timing, thresholding (decision) and equalization

D. Thresholding, timing and equalization.

49.   Consider the following set of instructions:

        STC

        CMC

        MOV   A, B

        RAL

        MOV   B, A

This set of instructions
A. doubles the number in Register by B
B. Divides the number in Register by 2.
C. multiples B by A
D. Adds A and B.

50.   The properties of air are
I.   Dry bulb temperature
II.   Wet bulb temperature
III.   Dew point temperature
IV.   Saturation temperature.
In case the relative humidity of air is 100%, then which of the above temperature will be equal?
A. I and II only
B. III and IV only
C. I and III only
D. I, II, III and IV

Solution

1.C.   The number of elements is given by the number of internal critical frequencies (i.e., number of poles and zeros other than those located at the origin and infinity) plus one. Then it is easy to find the number of elements for each case:
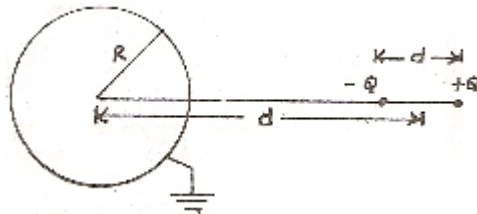
A : $3 + 1 = 4$;   B : $4 + 1 = 5$;
C : $2 + 1 = 3$:   D : $1 + 1 = 2$

2.B.

The charge induced on a spherical surface is given by

$$-\frac{QR}{D}$$

Where Q is the inducing point charge, D is the distance of the point charge from the centre of the sphere and R the radius of the sphere.

Total charge induced in the present case is

$$Q' = -qR\left[\frac{1}{d+d'/2} - \frac{1}{d-d'/2}\right]$$

$$= \frac{-qR(-d')}{d^2-(d'^2)/4} = \frac{qd'R}{d^2-(d'^2)/4}$$

Now for a dipole d' is very small, i.e., d' << d. Hence, $Q' = PR/d^2$ where, $P = qd'$, the dipole moment.

3.A.   a power MOSFET is a voltage-controlled device and requires only a small input current.

4.C.   Megger is an instrument for testing insulation.

5.C.   From the location of poles and zeros, it is seen that the plot corresponds to the function

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

6.C.
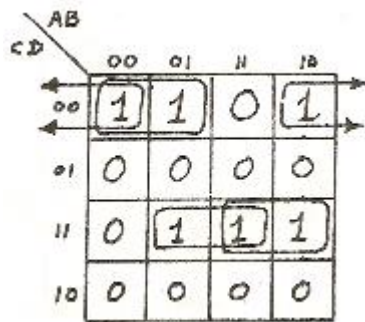
The function of plotted above has a 1 output for all invalid codes.

7.B. $BW_r = BW(1 - A_v)$

Where, BW_f = bandwidth with negative feedback

BW = bandwidth without feedback

A_v = mid-band gain without feedback

8.A. $f_0 = 9\sqrt{N_{max}}$ where N_{max} is maximum electron density.

9.D.   The dtat bus in 8080A / 8085 microprocessor is a group of sixteen bidirectional lines that are used for data transfer between the microprocessor and memory.

10.D.   As the ratio of thermal conductivity to electrical conductivity tends to be zero at absolute zero temperature, it can be safely concluded that electrical conductivity (denominator) increases to infinitely large values.

11.B. $F = C - P + 2$ expression states Gibb's phase rule.

12.B.   It starts from centre of top of the frame and moves to right.

13.C.   The equipment is called radar altimeter.

14.B.   A reflex Klystron functions as microwave oscillator.

15.A.   It is with reference to channel.

16.A.   The voltage across capacitor prior to closing of the switch is $6 \times 4/2 = 12$ V. Immediately after closing of the switch S, the source current is all diverted into the 'short' and capacitor

furnishes a current of 12 / 2 = 6 A in the 2-ohm resistor. The direction is opposite to the marked one. Thus I = -6 A.

17.C. The force on a charge moving in a magnetic field is F = q v x B; the force is $\perp$ to both v & B. Hence the magnitude of v is not changes and thus kinetic energy at the entry and exit points will be same.

18.B. A power MOSFET is a voltage controlled device and requires only a small input current.

19.A. The instrument is known as electrodynamics type.

20.C. $G(s) = \dfrac{K}{s(s+1)}$

The ch. eqn. corresponding to unity feedback control loop is $(s + 1) + K = 0$

i.e. $s^2 + s + K = 0$.

This may be written in the form

$s^2 + 2\,\delta\,w_n\,s + w_n{}^2 = 0$,

Wherein δ is the damping ratio

It is seen that $wn = \sqrt{K};\ \delta = 1/2\sqrt{k}$

Thus, if $K \to \infty$, $\delta \to 0$.

21.C. Maximum 1 / 0 spare which can be addressed by 8088 CUP is 65536.

22.B. Theoretical efficiency of Class-A power amplifier is 50%.

23.C. In quadraphonic sound there are four audio signals. Two signals provide the usual stereo effect left and right from the front; the other two, left and right from the back. Thus four loud speakers are necessary.

24.A. The stack pointer in the 8085 microprocessor is a 16 bit register that point to stack memory locations.

25.B. The range of Ultra High frequency is 300 MHz to 3 GHz.

26.C. Gunmetal is an alloy of 88% Cu + 2% Zn + 10% Sn.

27.B. Twenty five

28.A. An ideal pulse radar receiver should have a very large BW.

29.D. Klystron operates on the principle of velocity modulation.

30.C. It is known as fast moving satellite

31.D. The given function can be expressed as

$v(t) = \dfrac{V_0\,tu(t)}{T} - \dfrac{V_0\,(t-T)u(t-T)}{T} - V_0 u(t-T)$

The Laplace transform is :

$V(s) = \dfrac{V_0}{T}\left(\dfrac{1}{s^2} - \dfrac{e^{-Ts}}{s^2} - \dfrac{T}{s} \right)$

$= (V_0 / Ts^2)(1 - e^{-Ts}(1 + sT)$

32.C. The direction of flux density produced by all the elements of two vertical sections of the current shown, at points on PQ is to the plane of the paper and outward. This can be checked

with $I_B : I_{dI} \times I_R$. Then the force on an element of PQ is found from $dF = I_{dI} \times B$. Keeping in view the direction d I (which is the same as that of I (at points on PQ, we find direction of force on PQ is along - n.

33.A. Chopper drive is used in traction applications.

34.C. The eddy current error does not result in moving iron instrument with both d.c. and a.c.

35.A. $s^3 + K_1 s^2 + s + K_2 = 0$ may be written as

$$1 + \frac{K}{s(s^2 + K_1 s + 1)} = 0$$

$$1 + \frac{K_2}{s\left[s + 1\frac{(K_1)}{2}\frac{\sqrt{K_1^2)}}{4} - 1\right]\left[s + 1\frac{(K_1)}{2}\frac{\sqrt{K_1^2)}}{4} - 1\right]}$$

Thus only 1 and 2 are correct.

36.B. The widely used code in data communication is 7 bit ASCII.

37.A. The formula is pulse repetition frequency of the square wave.

38.A. $C = B \log_2 (1 + s / N) = 4k \log_2 16$

$\quad\quad = 16$ k bits / sec.

39.A. 10 address lines.

40.A. Varactor is a non-linear resistor.

41.C. Silicon steel used for electrical purposes has silicon percentage of 0.5%.

42.D. To eliminate ghosts in the picture we may change the antenna orientation or location.

43.A. The COHO in MTI radar operates at the intermediate frequency

44.A. It must be n cycles.

45.A. It is given by $H = (r$ km $- 6370)$ km.

46.D. Disk capacity $= 1000 \times 5 \times 17 \times 512$ Bytes

$\quad\quad\quad\quad\quad\quad = 435 \times 1000$ Bytes

$\quad\quad\quad\quad\quad\quad = 42.5$ MB.

47.C. $A_v = \frac{R_s}{R_s + (Y_1 / g_m)} ; \quad \frac{1}{A_w} = 1 + \frac{1}{g_m R_s}$

$\frac{10}{9} = 1 + \frac{1}{9}$

$1 + \frac{1}{9} = 1 + \frac{1}{g_m R_s}$

$g_m R_s = 9$

$g_m = \frac{9}{3K} = 3\, mA / V$

48.A. The correct sequence of the operations which such a repeater performs is timing, equalization and decision making.

49.A.
STC	CY	1	1
CMC	CY	CY	0
MOV	A,	B	A ← B

RAL   Rotate all left

MOV   B,   A   B ← A

50.D.   All four temperatures will be identical.

Solved by Sreeyush Sudhakaran © Techshare4u.weebly.com