

Analog Electronics

1) A clamper

- a) preserves the signal shape but changes the DC level
 - b) changes the signal shape but preserves the DC level
 - c) preserves the signal shape as well as DC level
 - d) changes the signal shape as well as DC level
- = Answer (a) preserves the signal shape but changes the DC level

2) While choosing operating point Q, which of the following factors of BJT are considered?

- a) power supply b) AC and DC load
 - c) Maximum transistor ratings d) All of the above
- = Answer (d) All of the above

3) While biasing JFET, if drain and source are interchanged, then

- a) device will work normally
 - b) device will get damaged
 - c) device will work but value of I_D will get affected
 - d) device will not operate at all
- = Answer (a) device will work normally

4) Match List I with List II and find the correct answers using the codes given below the lists.

List I

- P. Hartely
- Q. Wien bridge
- R. Crystal

List II

- 1. Low frequency oscillator
- 2. High frequency oscillator
- 3. Stable frequency oscillator
- 4. Relaxation frequency oscillator
- 5. Negative frequency oscillator

Codes

- | | | |
|------|---|---|
| P | Q | R |
| a) 2 | 1 | 3 |
| b) 1 | 2 | 3 |
| c) 3 | 1 | 2 |
| d) 2 | 3 | 1 |

P	Q	R
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= Answer (a) 2 1 3

5) Parasitic oscillator are

- a) free from distortion
 - b) unwanted oscillations created due to stray capacitances and inductances
 - c) harmonic oscillations
 - d) mechanical oscillations of the equipment resulting in either increase or reduction of oscillations produced in a oscillator
- = Answer (b) unwanted oscillations created due to stray capacitances and inductances

6) Which oscillator is characterized by a split capacitor in its tank circuits?

- a) RC phase shift oscillator
- b) Colpitts oscillator

- c) Wien bridge oscillator
 d) None of the above
 = Answer (b) Colpitts oscillator

7) Frequency of oscillations in Wien bridge oscillator with $R = 220 \text{ k}\Omega$, $C = 250 \text{ pF}$ is

- a) 4.89 kHz b) 2.89 kHz c) 3.89 kHz d) 1.89 kHz

= Answer (b) 2.89 kHz

$$f = \frac{1}{2\pi RC}$$

$$= \frac{1}{2\pi(220 \times 10^3)(250 \times 10^{-12})}$$

$$= 2.89 \text{ kHz}$$

$$1 \text{ mF} = 10^{-3} \text{ F}$$

$$1 \mu\text{F} = 10^{-6} \text{ F}$$

$$1 \text{ nF} = 10^{-9} \text{ F}$$

$$1 \text{ pF} = 10^{-12} \text{ F}$$

8) Perfect sine wave oscillations can be generated by providing feedback such that

- a) its poles lie on right half of S-plane
 b) its poles lie on left half of S-plane
 c) its poles lie anywhere on imaginary axis
 d) its poles lie on positive real axis in S-plane

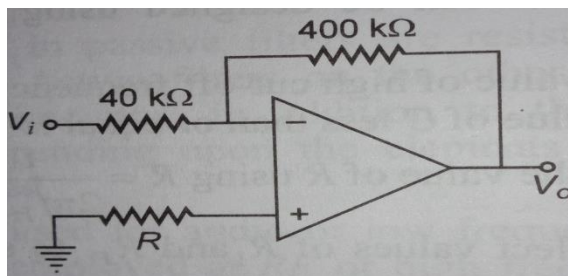
= Answer (c) its poles lie anywhere on imaginary axis

9) In UJT relaxation oscillator, if supply voltage is doubled then, the amplitude of the voltage waveform across capacitor will

- a) get doubled b) reduce to half
 c) not change at all d) None of these

= Answer (d) None of these

10) For the circuit shown below the value of $A_V = \frac{V_o}{V_i}$ is



- a) - 10 b) 10 c) - 11 d) 11

= Answer (a) - 10

$$A_V = -\frac{V_o}{V_i}$$

$$= -\frac{400}{40}$$

$$= -10$$

11) A clipper

- a) removes part of the input signal
 b) increases DC value of the input signal
 c) reduces DC value of the input signal

d) modifies shape of the input signal
= Answer (a) removes part of the input signal

12) Zener diode is used in regulators because

- a) it is operated in breakdown region
- b) it has efficiency for heavy load currents
- c) it is always connected in parallel with load
- d) voltage across it remains constant for large changes of current through it

= Answer (d) voltage across it remains constant for large changes of current through it

13) For half wave rectifier with capacitor input filter what will be the maximum voltage that will appear across the diode of an input AC of 10 V?

- a) 10 V b) 14 V c) 28 V d) 1.5 V

= Answer (c) 28 V

$$\begin{aligned}V_m &= V_{in} \sqrt{2} \\ &= 10 \times \sqrt{2} \\ &= 14.1 \text{ V} \\ \therefore 2V_m &= 28.2 \\ &\approx 28 \text{ V}\end{aligned}$$

14) The operating state that distinguishes a Silicon Controlled Rectifier (SCR) from a diode is

- a) forward conduction state b) forward blocking state
- c) reverse conduction state d) reverse blocking state

= Answer (b) forward blocking state

15) In a common-emitter amplifier, the unbypassed emitter resistance provides

- a) voltage shunt feedback b) current series feedback
- c) negative voltage feedback d) positive current feedback

= Answer (b) current series feedback

16) The depletion region or space charge region or transition region in a semiconductor p-n junction diode has

- a) electrons and holes b) positive ions and electrons
- c) negative ions and holes d) no ions, electrons or holes

= Answer (c) negative ions and holes

17) A major advantage of active filters is that they can be realized without using

- a) op-amps b) inductors c) resistors d) capacitors

= Answer (b) inductors

18) One of the applications of current mirror is

- a) output current limiting
- b) obtaining a very high current gain
- c) current feedback
- d) temperature stabilized biasing

= Answer (d) temperature stabilized biasing

19) In a commutation circuit to turn-off an SCR, satisfactory turn-off is obtained when

- a) circuit turn-off time < device turn-off time
 - b) circuit turn-off time > device turn-off time
 - c) circuit time constant > device turn-off time
 - d) circuit time constant < diode turn-off time
- = Answer (b) circuit turn-off time > device turn-off time

20) The type of power amplifier which exhibits crossover distortion in its output is
a) class A b) class B c) class AB d) class C
= Answer (b) class B

21) A circuit in which the output current is forced to equal the input current is called
a) current mirror
b) current balance circuit
c) current-controlled current device
d) None of the above
= Answer (a) current mirror

22) Heat sinks are used in power amplifier circuits primarily to increase
a) the voltage gain
b) the output power
c) collector dissipation rating of the transistor
d) dissipation of energy of free electrons
= Answer (c) collector dissipation rating of the transistor

23) Current limited power supplies can prevent damage to
a) pass transistors
b) rectifier diodes and power transformers
c) other circuits in the system
d) All of the above
= Answer (d) All of the above

24) In an amplifier response f_T (gain bandwidth product) is times greater than f_β (lower cut-off) frequency.
a) β b) bandwidth c) α d) None of these
= Answer (a) β

25) Transistor transconductance g_m is
a) directly proportional to current and inversely proportional to temperature
b) directly proportional to current and directly proportional to temperature
c) inversely proportional to current and directly proportional to temperature
d) inversely proportional to both
= Answer (a) directly proportional to current and inversely proportional to temperature

26) JFET cannot provide high voltage gain because of
a) low values of μ b) large values of μ
c) large values of g_m d) low values of g_m
= Answer (c) large values of g_m

27) In an RC coupled common-emitter amplifier, which of the following is true?

- a) Coupling capacitance affects the h_f response and bypass capacitance affects the I_f response
 - c) Both coupling and bypass capacitances affect the I_f response only
 - c) Both coupling and bypass capacitances affect by h_f response only
 - d) Coupling capacitance affects the I_f response and the bypass capacitance affects by h_f response
- = Answer (d) Coupling capacitance affects the I_f response and the bypass capacitance affects by h_f response

28) Which of the following power amplifier has highest conduction angle?

- a) Class A b) Class B c) Class AB d) Class C
- = Answer (a) Class A

29) Each stage of a three-stage amplifier has a voltage gain of 12. The overall voltage gain of the amplifier is

- a) 36 dB b) 1728 dB c) 14.4 dB d) 64.75 dB
- = Answer (d) 64.75 dB

Total gain = $20 \log(12 \times 12 \times 12)$ dB

$$= 64.75 \text{ dB}$$

30) In a differential amplifier, a large R_E leads to decrease in

- a) differential mode gain b) CMRR of the amplifier
 - c) common mode gain d) All of the above
- = Answer (c) common mode gain

31) Negative current feedback

- a) decreases input impedance b) increases output impedance
 - c) increases bandwidth d) All of the above
- = Answer (d) All of the above

32) Which type of amplifier has maximum efficiency?

- a) Class D b) Class B c) Class C d) Class A
- = Answer (a) Class D

33) If G_1, G_2 and G_3 are individual voltage gain of 3 stage practical cascade amplifier, the total voltage gain will be

- a) equal to product of 3 gains
- b) slightly more than product of 3 gains
- c) slightly less than product of 3 gain
- d) None of the above

= Answer (c) slightly less than product of 3 gain

34) The total current in any branch of the transistor amplifier is

- a) DC current b) AC current
 - c) difference of AC and DC current d) sum of AC and DC current
- = Answer (d) sum of AC and DC current

35) The stability factor $S_{(I_{CO})}$ is defined as

- a) the ratio of collector current I_C to reverse saturation current I_{CO}
 - b) the ratio of I_{CO} to I_C
 - c) the rate of change of I_C with respect to I_{CO}
 - d) the rate of change of I_{CO} with respect to I_C
- = Answer (c) the rate of change of I_C with respect to I_{CO}

- 36) R_E is used in differential amplifier to
- a) increase emitter current
 - b) increase common mode gain
 - c) increase CMRR
 - d) increase differential gain
- = Answer (c) increase CMRR

- 37) The value of g_m is maximum when
- a) $V_{GS} > 0$
 - b) $V_{GS} < 0$
 - c) $V_{GS} = 5\text{ V}$
 - d) $V_{GS} = 0$
- = Answer (d) $V_{GS} = 0$

- 38) Which class of amplifier operates with least distortion?
- a) Class A
 - b) Class B
 - c) Class C
 - d) Class D
- = Answer (a) Class A

- 39) The Darlington pair consists of the following two stage
- a) both CE
 - b) CE and CC
 - c) both CC
 - d) CE and CB
- = Answer (c) both CC

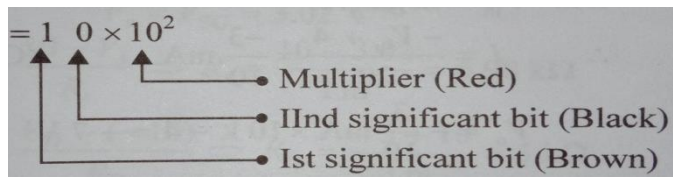
- 40) For an amplifier, the coupling method which gives the highest gain is
- a) transformer coupling
 - b) resistance coupling
 - c) capacitance coupling
 - d) impedance coupling
- = Answer (a) transformer coupling

- 41) The voltage series feedback in a feedback amplifier lead to
- a) increase in bandwidth, while the voltage gain becomes less sensitive to variations in components and device characteristics
 - b) decrease in overall gain, while the input resistance decreases
 - c) increase in distortion, while the output resistance decreases
 - d) decrease in input resistance, while the output resistance increases
- = Answer (a) increase in bandwidth, while the voltage gain becomes less sensitive to variations in components and device characteristics

- 42) An ideal op-amp is used to make an inverting amplifier. The two input terminals of the op-amp are at same potential because
- a) the two input terminals are directly shorted internally
 - b) the input impedance of the op-amp is infinity
 - c) the open-loop gain of the op-amp is infinity
 - d) CMRR is infinity
- = Answer (c), (d)

- 43) The colour code of 1 k Ω resistance is
- a) black, brown and red
 - b) red, brown and brown
 - c) brown, black and red
 - d) black, black and red

= Answer (c) brown,black and red
The colour code of 1k Ω resistor,
1 k Ω = $1 \times 10^3 \Omega$



44) In a transistor push-pull amplifier
a) there is no DC present in the output
b) there is no distortion in the output
c) there are no even harmonics in the output
d) there are no odd harmonics in the output
= Answer (a),(c)

45) The bandwidth of an n-stage tuned amplifier with each stage having a bandwidth of B, is given by
a) B/n b) B/\sqrt{n} c) $B\sqrt{2^{1/n} - 1}$ d) $B/\sqrt{2^{1/n} - 1}$
= Answer (c) $B\sqrt{2^{1/n} - 1}$