Here is the complete questionnaire without the answers listed.

MODULE 1 – OP-AMP BASICS

1. An operational amplifier is primarily a

A) Current-controlled device

B) Voltage-controlled voltage source

C) Power amplifier

D) Frequency selective device

2. The block diagram of an op-amp mainly consists of

A) Input buffer, power stage, regulator

B) Differential amplifier, gain stage, output stage

C) Rectifier, filter, amplifier

D) Comparator, oscillator, modulatorShutterstockExplore

3. The IC 741 op-amp is generally classified as a

A) Precision op-amp

B) General purpose op-amp

C) High-speed op-amp

D) Low-power op-amp

4. Typical power supply requirement for a 741 op-amp is

A) +5 V only

B) ±5 V

C) ±12 V to ±15 V

D) ±1.5 V

5. An ideal op-amp has

A) Infinite input impedance

B) Zero output impedance

C) Infinite gain

D) All of the above

6. Input bias current of an op-amp is defined as

A) Difference between input currents

B) Average of currents entering the input terminals

C) Output current at zero input

D) Offset current multiplied by gain

7. Input offset current is

A) Average of input currents

B) Difference between input bias currents

C) Current at output terminal

D) Current due to power supply

8. Input offset voltage is the

A) Voltage needed to produce zero output

B) Output voltage at zero input

C) Voltage across output terminals

D) Voltage across power supply

9. Thermal drift in op-amps is mainly due to

A) Power dissipation

B) Temperature variation

C) Frequency variation

D) Load changes

10. CMRR is a measure of an op-amp’s ability to

A) Amplify differential signals

B) Reject common-mode signals

C) Reduce noise

D) Increase bandwidth

11. Higher CMRR indicates

A) Poor noise immunity

B) Better common-mode rejection

C) Lower gain

D) Higher offset voltage

12. PSRR defines the ability of an op-amp to

A) Reject input noise

B) Reject power supply variations

C) Amplify DC signals

D) Reduce distortion

13. The frequency response of an op-amp indicates

A) Output current variation

B) Gain variation with frequency

C) Noise variation

D) Power loss

14. Slew rate is defined as

A) Maximum frequency of operation

B) Maximum rate of change of output voltage

C) Input voltage range

D) Output impedance

15. A low slew rate causes

A) Noise amplification

B) Signal distortion at high frequency

C) Increased gain

D) Reduced offset

16. In an inverting amplifier, the input is applied to

A) Non-inverting terminal

B) Output terminal

C) Inverting terminal

D) Power supplyShutterstock

17. The voltage gain of an inverting amplifier is

A) $1 + \frac{R_f}{R_{in}}$

B) $-\frac{R_f}{R_{in}}$

C) $\frac{R_{in}}{R_f}$

D) $-\frac{R_{in}}{R_f}$

18. In a non-inverting amplifier, the phase difference between input and output is

A) 180°

B) 90°

C) 0°

D) 270°

19. Voltage gain of a non-inverting amplifier is always

A) Less than 1

B) Equal to 1

C) Greater than or equal to 1

D) Negative

20. An op-amp with no feedback operates as a

A) Buffer

B) Integrator

C) Comparator

D) Amplifier

MODULE 2 – OP-AMP APPLICATIONS & 555 TIMER

1. A differential amplifier amplifies

A) Sum of inputs

B) Difference of inputs

C) Only common-mode signal

D) Output feedback

2. A summing amplifier performs

A) Multiplication

B) Integration

C) Weighted addition

D) Differentiation

3. A voltage follower has a gain of

A) Zero

B) Less than 1

C) Exactly 1

D) Very high

4. Main advantage of voltage follower is

A) High gain

B) Low input impedance

C) High input impedance

D) Phase inversion

5. In V–I converter (grounded load), the load is connected

A) Between output and ground

B) Between input and ground

C) In feedback path

D) Across power supply

6. An I–V converter is also known as

A) Transconductance amplifier

B) Transimpedance amplifier

C) Differential amplifier

D) Buffer amplifier

7. Instrumentation amplifier uses

A) One op-amp

B) Two op-amps

C) Three op-amps

D) Four op-amps

8. Main feature of instrumentation amplifier is

A) Low gain

B) Low input impedance

C) High CMRR

D) High distortion

9. An op-amp integrator acts as

A) Low-pass filter

B) High-pass filter

C) Band-pass filter

D) Oscillator

10. An op-amp differentiator acts as

A) Integrator

B) High-pass filter

C) Low-pass filter

D) Comparator

11. Precision rectifier is used to

A) Rectify high voltage

B) Rectify low-level signals

C) Generate AC

D) Amplify noise

12. Peak detector circuit stores

A) RMS value

B) Average value

C) Peak value

D) Instantaneous value

13. Sample and hold circuit is used in

A) DAC

B) ADC

C) Oscillator

D) Rectifier

14. A comparator compares

A) Two currents

B) Two frequencies

C) Two voltages

D) Two powers

15. Zero crossing detector detects

A) Maximum value

B) Minimum value

C) Zero level crossing

D) Average level

16. Schmitt trigger is a

A) Linear amplifier

B) Oscillator

C) Comparator with hysteresis

D) Rectifier

17. Window detector detects

A) Input above threshold

B) Input below threshold

C) Input within a range

D) Frequency variation

18. The 555 timer has

A) 3 pins

B) 5 pins

C) 8 pins

D) 10 pins

19. Astable multivibrator produces

A) Single pulse

B) No output

C) Square wave

D) DC voltage

20. Monostable multivibrator has

A) No stable state

B) One stable state

C) Two stable states

D) Three stable states

MODULE 3 – VOLTAGE REGULATORS & OSCILLATORS

1. A voltage regulator maintains

A) Constant current

B) Constant frequency

C) Constant voltage

D) Constant power

2. Series op-amp regulator uses

A) Shunt transistor

B) Series pass transistor

C) Zener diode only

D) SCR

3. IC 78XX series provides

A) Negative voltage

B) Adjustable voltage

C) Positive fixed voltage

D) AC voltage

4. IC 79XX series provides

A) Positive voltage

B) Negative voltage

C) Variable voltage

D) Dual voltage

5. 7805 regulator provides

A) 5 V AC

B) −5 V

C) +5 V

D) Adjustable output

6. Using 7805 as current source requires

A) Capacitor

B) Resistor

C) Inductor

D) Transformer

7. IC 723 is a

A) Timer IC

B) Comparator IC

C) General-purpose voltage regulator

D) Oscillator IC

8. 723 can be used for

A) Only low voltage regulation

B) Only high voltage regulation

C) Both low and high voltage regulation

D) AC regulation

9. Wien bridge oscillator produces

A) Square wave

B) Triangular wave

C) Sine wave

D) Sawtooth wave

10. RC phase shift oscillator uses

A) LC network

B) RC network

C) Crystal

D) Transformer

11. RC phase shift oscillator requires phase shift of

A) 90°

B) 120°

C) 180°

D) 360°

12. Triangular wave generator output slope depends on

A) Frequency only

B) RC values

C) Supply voltage

D) Load resistance

13. Sawtooth waveform has

A) Linear rise and fall

B) Exponential rise

C) Linear rise and sudden fall

D) Random variation

14. IC regulators have advantage of

A) Large size

B) Low reliability

C) Built-in protection

D) Complex circuitry

15. Line regulation refers to

A) Load current change

B) Output voltage change due to input variation

C) Temperature effect

D) Frequency response

16. Load regulation refers to

A) Input voltage change

B) Output voltage change due to load variation

C) Noise

D) Ripple factor

17. Ripple rejection indicates

A) Ability to reject noise

B) Ability to reject AC ripple

C) Gain stability

D) Thermal stability

18. High voltage regulator using 723 requires

A) External pass transistor

B) Only internal transistor

C) Zener diode

D) SCR

19. Low voltage regulator using 723 operates below

A) 37 V

B) 15 V

C) 7.15 V

D) 5 V

20. Fixed voltage IC regulators are preferred due to

A) High cost

B) Low efficiency

C) Simplicity and reliability

D) Complex design

MODULE 4 – FILTERS, PLL & DATA CONVERTERS

1. A low-pass filter allows

A) High frequencies only

B) Low frequencies only

C) All frequencies

D) No frequencies

2. A high-pass filter blocks

A) High frequencies

B) Low frequencies

C) Noise

D) DC only

3. First-order filter has

A) One reactive component

B) Two reactive components

C) Three reactive components

D) No reactive component

4. Second-order filter has

A) One pole

B) Two poles

C) Three poles

D) Four poles

5. PLL consists of

A) Comparator and amplifier

B) Phase detector, LPF, VCO

C) ADC and DAC

D) Oscillator only

6. PLL lock range is the

A) Frequency range for acquisition

B) Frequency range for maintaining lock

C) Output frequency

D) Capture speed

7. Capture range is

A) Greater than lock range

B) Equal to lock range

C) Less than lock range

D) Independent of lock range

8. IC 565 is a

A) Timer

B) PLL

C) ADC

D) DAC

9. PLL frequency multiplier works by

A) Dividing input frequency

B) Multiplying VCO frequency

C) Feedback division

D) Amplitude modulation

10. DAC converts

A) Analog to digital

B) Digital to analog

C) AC to DC

D) DC to AC

11. Resolution of DAC depends on

A) Clock frequency

B) Number of bits

C) Output voltage

D) Load resistance

12. Weighted resistor DAC suffers from

A) Matching problem

B) Low speed

C) High noise

D) No accuracy

13. R–2R ladder DAC advantage is

A) Complex resistor values

B) Better matching

C) High cost

D) Low accuracy

14. ADC converts

A) Digital to analog

B) Analog to digital

C) Frequency to voltage

D) Voltage to current

15. Flash ADC is

A) Slowest ADC

B) Medium speed

C) Fastest ADC

D) Least accurate

16. Counter type ADC is also called

A) Tracking ADC

B) Parallel ADC

C) Integrating ADC

D) Successive ADC

17. Successive approximation ADC uses

A) Counter

B) Comparator and DAC

C) Integrator

D) PLL

18. Integrating ADC is suitable for

A) High-speed applications

B) Noisy environments

C) RF signals

D) Video signals

19. Single slope ADC uses

A) Comparator and counter

B) DAC and comparator

C) VCO

D) PLL

20. Major advantage of integrating ADC is

A) High speed

B) High resolution

C) Noise immunity

D) Low cost