Electronics circuits:

Lec. One

Q1/ A field effect transistor (FET) is a……. semiconductor device.

a) None terminal b) Two Terminal c) One Terminal d) Three terminal

Q2/ There are two types of FET transistors, both of them are categorized in to……. .

a) NPN and PNP b) NP junction and PN junction c) N-channel and P-channel d) None of them

Q3/ The Gate terminal is similar to the …… of an ordinary transistor.

a) Emitter b) Base c) Collector d) Anode

Q4/ The depletion regions around the p-n junctions of JFET are of equal thickness and symmetrical under…… conditions.

a) Forward bias b) Reverse bias c) No bias d) None of them

Q5/ The two p-n junction form a very thin depletion layer in JFET when a voltage (VGS) is ……..

a) Equal to VDS b) Zero c) Negative value d) Positive value

Q6/ A large amount of electrons will flow from source to drain in JFET when the depletion layer is ……. .

a) Symmetrical b) The same c) Very thin d) None of them

Q7/ when the gate –source voltage equal to the zero the drain current is …….. .

a) Zero b) Source current c) Drain saturation current d) None of them

Q8/ When a reverse VGS is applied across the gate and source terminals the width of depletion layer is …….. .

a) Not effected d) Decreased c) Increased d) None of them

Q9/ At the P-channel JFET the channel current carriers will be …… .

a) Electrons b) Holes c) Electrons and holes d) Ions

Q10/ Which of the following regions is NOT mentioned in the transconductance curve?

a) Ohmic b) Saturation c) Linear d) Cut off

Q11/ Junction field effect transistor(JFET) is categorized in to ……. .

a) Depletion and Enhancement type b) Depletion type c) Enhancement type d) None of them

Q12/ Metal Oxide Semiconductor transistor (MOSFET) is categorized in to ……. .

a) Depletion and Enhancement type b) Depletion type c) Enhancement type d) None of them

Q13/ The Transistor that also known as Insulated Gate FET is …….. .

a) JFET b) BJT c) MOSFET d) OP-Am

Q14/ The input impedance of MOSFET is …… .

a) Equal to zero b) Very Low c) Very high d) None of them

Q15/ If the bias voltage is zero or negative in MOSFET then the transistor may ……

a) Switch ON b) Switch Off b) As amplifier d) None of them

Q16/ The Transistor that operated in only depletion mode is ……. .

a) BJT b) MOSFET c) JFET d) NPN

Q17/ FETs Transistors are called……. .

a) Bipolar Transistors b) Tripolar Transistors c) Unipolar Transistors d) None of them

Q18/ The Transistor that being a voltage control device is……. .

a) BJT b) FET c) OP-Amp d) PN-Junction

Q19/ What is the primary function of a field-effect transistor (FET)?

a) To amplify current b) To control the flow of current through a semiconductor channel c) To convert AC to DC d) To store electrical energy

Q20/ What are the two types of Junction Field Effect Transistors (JFET)?

a) N-channel and P-channel b) n-type and p-type c) silicon and germanium d) bipolar and unipolar

Q21/ Which terminal of the JFET is used to control the flow of current from source to drain?

a) Source (S) b) Drain (D) c) Gate (G) d) Emitter

Q22/ Which of the following statements is true about the Metal Oxide Semiconductor Field Effect Transistor (MOSFET)?

a) MOSFET has only two terminals. b) The gate is electrically insulated from the current carrying channel. c) MOSFET is not used in electronic circuit applications. d) The gate current is very high.

Q23/ In enhancement mode MOSFETs, what happens when a negative voltage is applied to the gate?

a) The channel conducts freely b) Electrons accumulate on the gate c) The current conduction increases d) The source and drain terminals are shorted

Q24/ What happens to the current from source to drain in an n-channel MOSFET when a positive voltage is applied to the gate?

a) The current decreases. b) The current remains the same. c) The current increases d) The current is cut off.

Q25/ In which region does the enhancement mode MOSFET operate when the bias voltage is zero or negative?

a) Ohmic region b) Saturation region c) Cut-off region d) Enhancement region

Q26/ What type of devices are FETs classified as due to their operation depending only on majority carriers?

a) Bipolar devices b) Unipolar devices c) Hybrid devices d) Linear devices

Lec. Two:

Q1/ Which equation defines the relationship between ID and Vgs for a JFET?

a) Ohm's Law b) Kirchhoff's Voltage Law c) Shockley's equation d) Thevenin's theorem

Q2/ What is the value of the drain current (ID) when the gate-source voltage (Vgs) is 0.3 Vp?

a) 0 mA b) IDss c) 0.25 IDss d) 0.5 IDss

Q3/ What is the relationship between the drain current and the saturation level when Vgs = Vp/2?

a) The drain current is equal to the saturation level. b) The drain current is one-half the saturation level. c) The drain current is one-fourth the saturation level. d) The drain current is twice the saturation level.

Q4/ How many plot points are typically used to sketch the transfer curves?

a) Two plot points b) Three plot points c) Four plot points d) Five plot points

Q5/ What is the value of ID when Vgs = Vp/2 (where IDss=4mA and Vp = 3v)

a) 4 mA b) 2 mA c) 1 mA d) 3 mA

Lec. Three:

Q1/ For the circuit of fig.(1), the VGSQ is :

a) 3V b) -2V c) -2.3V b) 2V

Q2/ For the circuit of fig.(1), the IDQ is :

a) 5.1 mA b) 5.3 mA c) -5.5 mA d) 5.6 mA

Q3/ For the same circuit of fig.(1), the VDS is :

a) 4.5 V b) 4.1 V c) 4.6 V b) 4.8 V

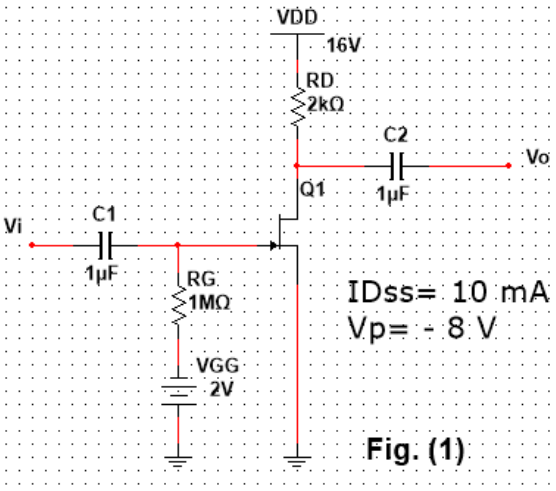


Fig. (1)

Q4/ For the circuit of fig.(2), the VGSQ is :

a) -2.7 V b) -2.6 V c) -2.3 V d) 2.7 V

Q5/ For the circuit of fig.(2), the IDQ is:

a) 2.8 mA b) -2.7 mA c) -2.8 mA d) 2.6 mA

Q6/ For the same circuit of fig.(2), the VDS is:

a) 7.98 V b) 8.11 V c) 8.82 V d) 7.87 V

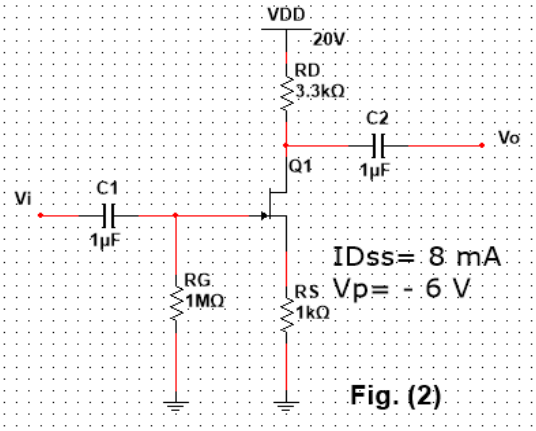


Fig. (2)

Q7/ For the circuit of fig.(3), the VG is :

a) -2.7 V b) -1.88 V c) -2.1 V d) 1.82 V

Q8/ For the circuit of fig.(3), the VGSQ is :

a) -2.7 V b) -1.8 V c) -2.1 V d) 1.82 V

Q9/ For the circuit of fig.(3), the IDQ is:

a) 2.8 mA b) -2.7 mA c) 2.4 mA d) 2.6 mA

Q10/ For the same circuit of fig.(3), the VDS is:

a) 6.64 V b) 5.88 V c) 6.87 V d) 7.87 V

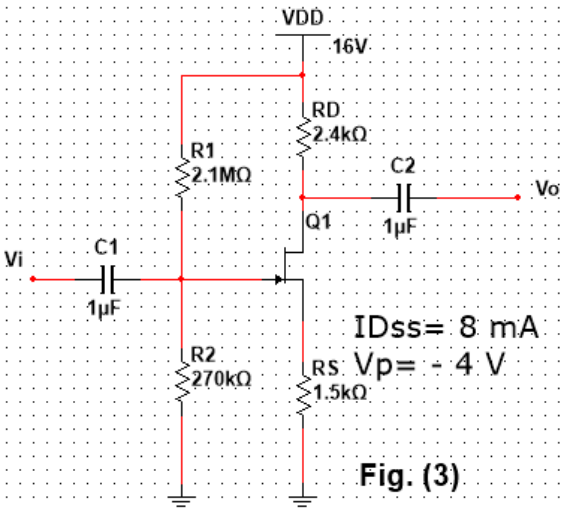


Fig. (3)

Q11/ For the same circuit of fig.(3), the VDG is:

a) 7.61 V b) 8.42 V c) 8.87 V d) 7.88 V

Q12/ For the circuit of fig.(4), the VGSQ is :

a) -1.3 V b) -0.42 V c) -0.35 V d) 1.12 V

Q13/ For the circuit of fig.(4), the IDQ is:

a) 5.8 mA b) -6.1 mA c) 6.1 mA d) 6.9 mA

Q14/ For the same circuit of fig.(4), the VDS is:

a) 7.11 V b) 7.23 V c) 7.87 V d) 8.87 V

Q15/ For the circuit of fig.(5), the VGSQ is :

a) -1.3 V b) -0.48 V c) 1.4 V d) 1.9 V

Q16/ For the circuit of fig.(5), the IDQ is:

a) 5.2 mA b) -3.1 mA c) 4.1 mA d) 3.4 mA

Q17/ For the same circuit of fig.(5), the VDS is:

a) – 4.7 V b)-5.81 V c) 3.87 V d) 6.88 V

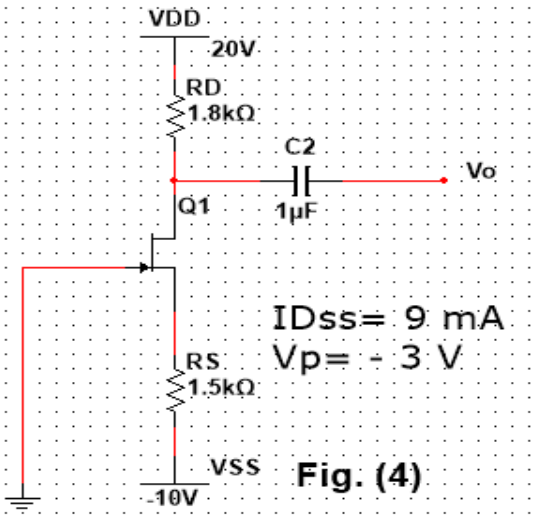


Fig. (4)

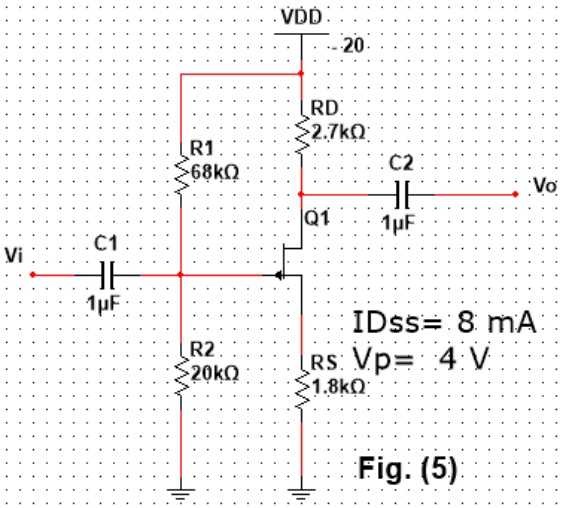


Fig. (5)

Lec. Four:

Q1/ In a single-ended input operation, where is the input signal connected?

a) Both inputs are connected to the ground b) The input is applied to the minus input with the plus input at ground c) The input is connected to one input with the other input grounded

d) The input is connected in parallel to both inputs.

Q2/ What type of operation is described when only one input is used in the circuit?

a) Differential operation b) Single-ended operation c) Ground operation d) Amplified operation

Q3/ In a double-ended operation, what does the resulting output represent when two

separate signals are applied to the inputs?

a) The sum of the two signals b) The average of the two signals c) The difference between the two signals d) The product of the two signals

Q4/ What type of output does an op-amp produce when operated with opposite outputs?

a) Single-ended output b) Double-ended output c) Ground-referenced output d) Floating output

Q5/Why is the difference output signal twice as large as either Vo1 or Vo2?

a) Because it is measured with respect to ground b) Because the outputs are of opposite polarity

c) Because of the input signal frequency d) Because of the circuit's power supply

Q6/ What is the result when the same input signals are applied to both inputs in a

common-mode operation?

a) An amplified output of the difference signal b) A 0-V output c) A reduced input voltage

d) An increase in input resistance

Q7/ What is the operational mode called when a single input signal is applied to one input of the differential amplifier while the other input is grounded?

a) Common-mode b) Double-ended c) Single-ended d) Differential-mode

Q8/ How many outputs does a basic differential amplifier circuit have?

a) One b) Two c) Three d) Four

Q9/ What occurs in common-mode operation of a differential amplifier when the same input signal is applied to both inputs?

a) The output signal is a large positive value b) The output signal is a large negative value

c) The output signal is zero due to cancellation d) The output signal fluctuates randomly

Q10/ What is the significance of the ratio of difference gain to common gain in a differential amplifier?

a) It is known as signal amplification ratio b) It is referred to as common-mode rejection

c) It represents the total output voltage d) It indicates the power consumption of the amplifier

Q11/ What is a key characteristic of an operational amplifier (op-amp) in terms of its input impedance?

a) Very low input impedance b) Moderately low input impedance c) Typically a few mega ohms d) Infinite input impedance

Q12/ Which input of the operational amplifier produces an output that is in phase with the applied signal?

a) Non-inverting input b) Inverting input c) Ground input d) Feedback input

Q13/ In the ideal op-amp equivalent circuit, what are the characteristics of the input and output resistances?

a) Finite input resistance and infinite output resistance b) Infinite input resistance and zero output resistance

c) Zero input resistance and finite output resistance d) Finite input resistance and zero output resistance

Q14/Why is the inverting amplifier more widely used than the non-inverting amplifier?

a) It is simpler to design b) It has better frequency stability c) It requires fewer components

d) It can handle higher input voltages

Q15/ Which of the following statements is true about the unity follower circuit?

a) It provides a gain of less than unity. b) It introduces phase reversal. c) The output voltage is equal to the input voltage. d) It only works with negative voltages.

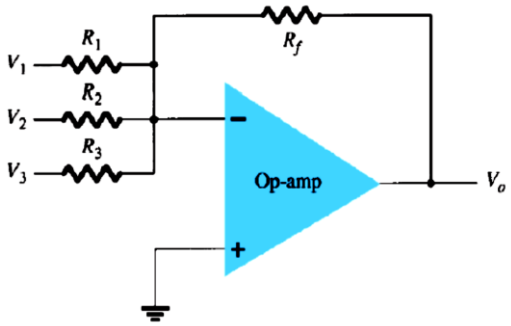
Q16/ 1. What type of circuit is described in the Fig. below?

a) High-pass filter

b) Summing amplifier

c) Low-pass filter

d) Differential amplifier



Q17/ In a subtractor circuit using an OP-AMP, if Rf equals Rl, what is the relationship of the output voltage (vo) to the input voltages (v1 and v2)?

a) vo = v2 + v1 b) vo = v2 - v1 c) vo = v1 - v2 d) vo = v1 + v2

Q18/ What is the output voltage (v0) formula derived from the given input values v1, v2,

and v3? Where V1= 2sinwt, V2= 5V and V3= -100 V.

a) 2 sin ωt - 95 V b) 2 sin ωt + 95 V c) -2 sin ωt + 100 V d) 2 sin ωt + 100 V

Q19/ what is the peak output voltage when a 5mV, 1-kHz sinusoidal signal is applied to the OP-AMP integrator with R = 100 K and C = 1 µF?

a) 1/40π mV b) 1/45π mV c) 2π mV d) 3/40π mV

Q20/ In the inverting differentiator amplifier, what happens when the resistor

and capacitor are interchanged?

a) The circuit becomes an integrator b) The circuit remains a differentiator c) The gain of the circuit increases d) The circuit will not function

Q21/ What is the type of operational amplifier that should we use to get an output voltage about 12 V instead of -10 V?

a) Differential amp. b) Inverting Amp. c) non inverting Amp. d) Subtractor Amp.

Q22/ The output voltage of the following sets of voltages and resistors is: (where Rf= 1M, V1=1V ,V2=2V ,V3=3V , R1=500k ,R2 =1M and R3=1M).

a) 5 V b) -3 V c) -5 V d) -7 V

Q23/ what is the peak output voltage when a 5mV, 1-kHz sinusoidal signal is applied to the OP-AMP differential with R = 100 K and C = 1 µF?

a) 100π mV b) 1000π mV c) 2π mV d) 3/40 π mV