Total No. of printed pages = 6

Et-405/AE-II/4th Sem/2017/N

ANALOG ELECTRONICS – II

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

PART – A

1. State true or false : 1×7=7

   (i) FETs are bipolar device.

   (ii) A differential amplifier is basically a direct-coupled amplifier.

   (iii) In an ideal Op-Amp the output should be zero when both the inputs are grounded.

   (iv) The output of an unregulated DC power supply is pulsating DC.

   (v) A differentiator circuit is also a high-pass filter.

[Turn over

(vi) Bi-stable multivibrators are also called free-running multivibrators.

(vii) Schmitt trigger circuit can be used for converting sine-wave to a square-wave.

2. Fill up the gaps : 1×8=8

(i) In a UJT, the semiconductor bar is _____ doped.

(ii) In a JFET, the drain current is _____ when gate-to-source voltage is zero.

(iii) The ability of a differential amplifier to reject _____ signal is expressed by a ratio called CMRR.

(iv) _____ has been considered as mostly used industry standard Op-Amp IC.

(v) An IC-7912 is used to obtain _____ volt DC regulated output.

(vi) A _____ circuit removes the portion of a given waveform.

(vii) In multivivrators the trigger signal is applied to the _____ of one of the transistors.

(viii) A _____ deflection system uses a sweep signal as the horizontal sweep signal.

3. Choose the correct answer : $1 \times 10 = 10$

(i) When a UJT is turned on, the resistance between the emitter and lower base terminal

(a) increases

(b) decreases

(c) becomes infinite

(d) remains the same

(ii) In enhancement n-channel MOSFET, and induced channel is created if

(a) $V_{GS} = 0$

(b) V_{GS} is negative

(c) V_{GS} is positive

(d) None of these

(iii) The output of a differential amplifier is proportional to the

(a) differentiation of input signal

(b) multiplication of the two input signals

(c) difference of the two input signals

(d) sum of the two input signals

(iv) The open circuit voltage gain of an Op-Amp is typically of the order of

(a) 0.1 (b) 10

(c) 10^3 (d) 10^6

(v) In an Op-Amp integrator circuit the feedback path comprises of a

(a) resistor (b) inductor

(c) capacitor (d) diode

(vi) In a series pass linear regulator, the voltage drop across the series pass element

(a) changes directly with the changes in the output voltage

(b) is independent of changes in output voltage

(c) changes inversely with changes in output voltage

(d) none of these

(vii) A clamping circuit is used to

(a) remove a portion of a waveform,

(b) shifts the average level of a signal

(c) amplifies a signal,

(d) changes the shape of a waveform

(viii) Multivivrators belongs to the category of

(a) Sinusoidal oscillators

(b) Triangular wave oscillators

(c) Ramp oscillators

(d) Square wave oscillators

(ix) One of the followings can be used to generate a pulse whenever triggered

(a) Mono-stable multivivrator

(b) Bi-stable multivivrator

(c) Astable multivivrator

(d) Schmitt Trigger

(x) A sweep signal generator produces

(a) DC signal

(b) Square waves

(c) Sinusoidal waves

(d) Triangular waves

PART – B

Answer any *three* questions.

1. Classify Field Effect Transistor (FET) and explain the working of a MOSFET. 15

2. Mention the characteristics of an ideal Operational Amplifier. Also, explain how an Op-Amp can be used as an Adder and as a Differentiator. 5+10=15

3. What are Clipping and Clamping circuits ? Explain. Also explain the working of a combinational biased clipper. 6+9=15

4. Differentiate between the three types of multi-vivrators and using neat circuit and waveforms explain the working of any one of them. 3+12=15

5. Write short notes on any *two* from the followings : $2 \times 7\frac{1}{2} = 15$

   (a) BJT V/s FET

   (b) Differential amplifier

   (c) DC Voltage Regulators

   (d) RC High-Pass and Low-Pass Filter

   (e) Schmitt Trigger.