

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III • EXAMINATION – WINTER • 2014

Subject Code: 2130305**Date: 01/01/2015****Subject Name: Analog Circuits - I****Time: 2:30 p.m. to 5:00 p.m.****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Define **07**
(i) Electron volt
(ii) Potential
(iii) Critical wavelength for semiconductor
(iv) Mean life time of carrier
(v) Mobility of electron
(vi) Volt equivalent of temperature
(vii) Pinch off voltage of FET
(b) Explain following terms related to op-amp: **07**
1. CMRR, 2. PSRR, 3. Slew Rate, 4. Channel separation in multiple op-amps
IC, 5. Equivalent input noise voltage and current, 6. Input offset current, 7.
Input offset voltage
- Q.2** (a) Explain the switching characteristic of transistor with neat sketch. **07**
(b) Draw the circuit diagram and explain the working of full wave bridge rectifier **07**
and derive the expression for average output current and rectification efficiency.
OR
(b) State the use of clipping circuits. Discuss with neat sketch working of a biased **07**
parallel clipper.
- Q.3** (a) Compare JFET and MOSFET. **07**
(b) Draw the block diagram of a voltage series feedback amplifier and derive the **07**
equation for input impedance, output impedance and the voltage gain.
OR
- Q.3** (a) Give points of difference between BJT and FET. Also explain FET as voltage **07**
variable resistor.
(b) Calculate the voltage gain, input and output resistances of a voltage series **07**
feedback amplifier having $A_V = 300$, $R_i = 1.5 \text{ k}$, $R_o = 50 \text{ k}$ and $\beta = 1/15$.
- Q.4** (a) What are the characteristics of an ideal op-amp? Draw its equivalent circuit **07**
along with voltage transfer curve.
(b) Draw the circuit of basic integrator using an op-amp. What are the problems **07**
associated with this configuration? How they are overcome?
OR
- Q.4** (a) Write short note on: (i) sample and hold circuit **07**
(ii) comparator circuit using op-amp
(b) Explain the application of op-amp as a subtractor and summing amplifier using **07**
differential configuration.
- Q.5** (a) What do you understand by precision rectifier? Draw half wave precision **07**
rectifier circuit and explain with necessary waveforms.

- (b) Draw and explain Triangular and Sawtooth wave generator circuit using op-amp. **07**

OR

- Q.5** (a) Explain Schmitt trigger circuit along with circuit diagram and necessary waveforms. State its advantages and applications. **07**
- (b) Explain working of monostable multivibrator using IC 555 with internal blocks. **07**
Mention applications of monostable and astable multivibrator using 555 timer.
