

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 and derive the expression for average output current and rectification efficiency. **07**
- OR**
- (b) State the use of clipping circuits. Discuss with neat sketch working of a biased parallel clipper. **07**
- Q.3** (a) Compare JFET and MOSFET. **07**
 (b) Draw the block diagram of a voltage series feedback amplifier and derive the equation for input impedance, output impedance and the voltage gain. **07**
- OR**
- Q.3** (a) Give points of difference between BJT and FET. Also explain FET as voltage variable resistor. **07**
 (b) Calculate the voltage gain, input and output resistances of a voltage series feedback amplifier having $A_V = 300$, $R_i = 1.5 \text{ k}$, $R_o = 50 \text{ k}$ and $\beta = 1/15$. **07**
- Q.4** (a) What are the characteristics of an ideal op-amp? Draw its equivalent circuit along with voltage transfer curve. **07**
 (b) Draw the circuit of basic integrator using an op-amp. What are the problems associated with this configuration? How they are overcome? **07**
- 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 differential configuration. **07**
- Q.5** (a) What do you understand by precision rectifier? Draw half wave precision rectifier circuit and explain with necessary waveforms. **07**

- (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. Mention applications of monostable and astable multivibrator using 555 timer. **07**
