B.E. / B.Tech. Electrical (Electronics & Power) Engineering (Model Curriculum) Semester-III

# 003 / SE103 - Analog Electronics Circuits

P. Pages : 2 **GUG/S/25/13854**

Time : Three Hours * 2 2 8 9 * Max. Marks : 80

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Notes : 1. All questions carry marks as indicated.
2. Assume suitable data wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.

**1.** a) What is biasing. Draw and explain voltage divider biasing circuit. **8**

b) What is rectifier. Explain the operation of bridge wave rectifier with neat circuit diagram and waveform. **8**

**OR**

**2.** a) What is Clipper. Draw and explain the operation of combinational clipper. **8**

b) Draw the low Frequency hybrid $\pi$ model of transistor and explain the meaning of each components of a model. **8**

**3.** a) What is depletion type MOSFET. Explain the operation of n-channel depletion type MOSFET with its drain and transfer characteristics. **8**

b) Draw and explain ac equivalent model of depletion and enhancement n-type MOSFET. **8**

**OR**

**4.** a) Draw and explain the small signal model of common source enhancement MOSFET. **8**

b) Draw and explain the feedback bias circuit for enhancement type MOSFET. **8**

**5.** a) What is operational amplifier. Draw and explain the internal block diagram of an operational amplifier. **8**

b) With the help of circuit diagram and frequency response explain the operation of direct coupled multistage amplifier. **8**

**OR**

**6.** a) What is slew rate. Derive the mathematical expression of slew rate. **8**

b) What is differential amplifier. Draw and explain the operation of Dual input balanced output differential amplifier. **8**

**7.** a) What is PID controller. Draw and explain the operation of op-amp PID controller. **8**

b) What is oscillator. Draw and explain the operation of op-amp phase shift oscillator. **8**

**OR**

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| **8.** | a) | Explain the working of op-amp noninverting amplifier. Derive the expression for its voltage gain. | **8** |
| | b) | Draw and explain successive approximation analog to digital converter. | **8** |
| **9.** | a) | What is comparator. Draw and explain the operation of inverting and non inverting comparator circuit. | **8** |
| | b) | Explain the operation of triangular wave generator with the help of circuit diagram and waveforms. | **8** |

**OR**

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| **10** | a) | Define precision rectifier. Explain the operation of full wave precision rectifier circuit. | **8** |
| | b) | What zero crossing detector. Draw and explain the operation of zero crossing detector. | **8** |

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