Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent institution of MAHE, Manipal)

I SEMESTER M.TECH. (INDUSTRIAL AUTOMATION AND ROBOTICS)

END SEMESTER EXAMINATIONS, NOV-DEC2018

SUBJECT: ANALOG AND DIGITAL ELECTRONICS **[**MTE 5131]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Data not provided may be suitably assumed

1A. Design a circuit using OP-AMP for diode match finder application. **03**

1B. Design a circuit with an adjustable feedback gain to record 4 musical instruments in parallel with a singer for a common amplified signal. **03**

1C. Design an 8-bit serial in serial out shift register. **04**

2A. Explain grey codes conversion from BCD and identify the use of gray codes in shaft position encoders. **04**

2B. Design a circuit using timer to generate frequency of 2KHz with 50% duty cycle. **06**

3A. Design a BCD to seven segment driver circuit using active low output decoders. **05**

3B. Design a synchronous 3 bit up-down counter with state timing diagram. **05**

4A. Compare the working principles of rectifier circuit with a clipper circuit for analog input signals using OP-AMP. **05**

4B. Add the following unsigned binary numbers and perform 2's complement: **05**

a. 11111110 and 101111
b. 11010010 and 100011
c. 10000001 and 100110

5A. Calculate the voltage gain of the OP AMP as shown in **fig 5(A)**. **02**

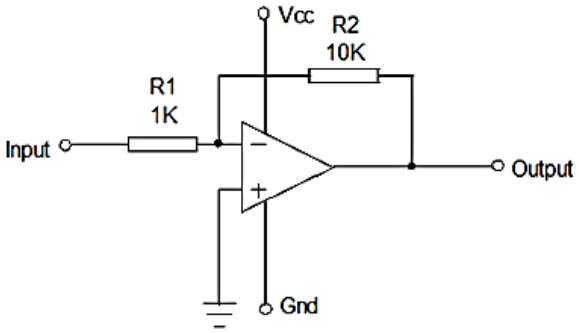

Fig 5(A)

5B. Construct a truth table for 8421-2421 BCD numbers conversion. **03**

5C Design a 4 bit parallel in serial out shift register and paraphrase data movement in each clock pulse. (Taking the data flow 1111). **05**