# MANIPAL INSTITUTE OF TECHNOLOGY

(A Constituent Institute of Manipal University)

Manipal – 576 104

**THIRD SEMESTER B.E. DEGREE SUMMER/ MAKE UP EXAMINATIONS JULY 2008**

**SUBJECT: ELECTRONIC DEVICES & CIRCUITS (BME 201 )**

(REVISED CREDIT SYSTEM)

**Monday, July 28, 2008: 2.00 - 5.00 p.m**

**TIME: 3 HOURS** **MAX. MARKS: 100**

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**Instructions to Candidates:**

1. **Answer any FIVE full questions.**
2. **Draw labeled diagram wherever necessary**

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1. (a) With V-I Characteristics explain the operation of a pn diode. Write the current equation. Also find the diode current if a forward bias of 0.7 Volt is applied to a silicon diode having a maximum reverse saturation current of 100 nano ampere. — 08

   (b) Explain the operation of a SCR with its V-I characteristics and mention its applications. — 07

   (c) Explain the operation of a photo diode with its characteristics. Mention its applications. — 05

2. (a) Draw a common emitter npn transistor circuit. Draw its input and output characteristics and explain all the operating regions. Also derive the relation of collector current in active region. — 10

   (b) Draw a neat diagram of n-channel enhancement type MOSFET and explain its operation with drain and transfer characteristics. — 10

3. (a) Draw the circuit of a UJT and draw its V-I characteristics and explain. Also give a application of UJT and explain. — 10

   (b) Explain the various steps observed in the fabrication of Integrated Circuits. List its advantages. — 10

4. (a) Draw the circuit of a common source FET amplifier with source resistance. Draw its small signal model and derive the relation of the voltage gain. — 10

(b) For the circuit shown in fig.Q4b, assume $h_{FE} = 100$, (i) Find if the silicon transistor is in cutoff, saturation or in active region and find $V_o$.  10

(ii) find minimum value of emitter resistor $R_E$ for which the transistor operates in the active region.

5. (a) Derive the relations of the stability factors S and $S^1$ of a self biased transistor circuit.  08

(b) Write a note on zener diode  06

(c) Write a note on bias compensation in transistor circuits.  06

6. (a) Draw a single stage CE transistor amplifier circuit. Draw its  10

h-parameter model. Derive the relations of various gains, input and out impedances.

(b) Draw a hybrid-$\pi$ model of a transistor in the CE configuration and discuss on the circuit components.  10

Figures