

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

**CLASS: BTECH
BRANCH: CS/IT/ECE/EEE**

**SEMESTER: I
SESSION: MO/2018**

SUBJECT: EC101 BASICS OF ELECTRONICS & COMM. ENGG.

TIME: 2 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 25.
 2. Candidates may attempt for all 25 marks.
 3. Before attempting the question paper, be sure that you have got the correct question paper.
 4. The missing data, if any, may be assumed suitably.
-

- Q1. (a) What is an ideal diode? Draw its equivalent circuit and V-I characteristics. [2]
Q1. (b) Explain the static and dynamic resistance of the p-n junction diode using the V-I characteristics. Determine the ac resistance for a semiconductor diode (Silicon) having a forward bias voltage of 200 mV and reverse saturation current of 1 μ A at room temperature (300 $^{\circ}$ K). [3]
- Q2. (a) A half-wave rectifier uses a diode with a forward resistance of 100 Ω . If the input ac voltage is 220 V (rms) and the load resistance is of 2k Ω , determine (i) the peak inverse voltage when the diode is ideal, (ii) the transformer utilization factor. [2]
Q2. (b) Derive the expression for ripple factor in a full wave rectifier circuit (center-tap type) with shunt capacitor filter. [3]
- Q3. (a) Draw the input and output characteristics of Common-base transistor configuration. Derive the relation between α and β . [2]
Q3. (b) Calculate the values of I_c , I_B and V_{CE} for the circuit of figure 1. [3]

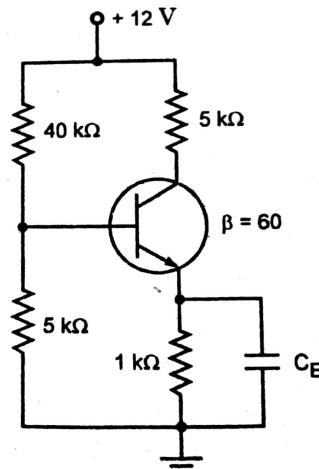


Figure 1

- Q4. (a) List out the advantages of the FET over conventional BJT? Determine the relation between the drain resistance, transconductance and amplification factor of FET. [2]
Q4. (b) With the help of neat sketches explain the construction and operation of p-channel enhancement type MOSFET. [3]
- Q5. (a) A transistor amplifier with negative feedback has a voltage gain of 600 without feedback, and 50 with feedback. Calculate the percentage of output which is feedback to the input. [2]
Q5. (b) Draw and explain the Hartley oscillator circuit using an n-p-n transistor. Write the expression for frequency of oscillation for it. [3]