Reg. No.										

MANIPAL UNIVERSITY

THIRD SEMESTER B.S. (ENGG.) DEGREE EXAMINATION – DECEMBER 2015

SUBJECT: ELECTRONIC DEVICES AND CIRCUITS (EC 241)

(BRANCH: E&C/E&E)

(NEW SCHEME)

Monday, December 14, 2015

Time: 10:00 – 13:00 Hrs. Max. Marks: 100

- **Answer any FIVE full questions.**
- **Missing data if any may be suitably assumed.**

1A. With a neat circuit diagram, explain the working of BJT as a switch.

1B. Explain the input / output characteristics of a NPN transistor and explain different region in the characteristics.

1C. Write short notes on Varactor diode and LED.

(6+8+6 = 20 marks)

2A. Explain the working of full wave bridge rectifier with circuit diagram and waveforms. Derive the expression for rms current, average current, ripple factor and efficiency.

2B. Explain the self-bias circuit and determine the expressions for the operating point. Perform the load line analysis for the same for variations in V_{CC}, I_B and R_C.

(10+10 = 20 marks)

3A. Explain the different resistances of a diode and derive its expression. Find the static and dynamic resistances of a germanium diode with 0.2 V forward bias applied, if reverse sat current is 1μA and temperature is 30°C.

3B. Explain the construction, working and characteristics of JFET. Sketch drain and transfer characteristics.

3C. In a transistor circuit, when the base current is increased from 0.32 mA to 0.48 mA, the emitter current increases from 15 mA to 20 mA. Find α_{ac} and β_{ac} values.

(8+8+4 = 20 marks)

4A. Derive the expression for current gain of common emitter transistor amplifier with resistive load with the help of h parameter model.

4B. For the circuit shown in Fig Q4B, determine I_{BQ}, I_{CQ}, V_{CEQ}, V_C, V_E, V_B. Draw the load line.

(10+10 = 20 marks)

5A. Derive the expression for A_I, A_V, A_{Vs}, A_{Is}, R_i, and R_o of a transistor amplifier using h parameters.

5B. Explain in detail RC coupled Amplifier.

(10+10 = 20 marks)

6A. With the help of circuit diagram and expressions, explain load regulation and line regulation of voltage using Zener diode.

6B. Design a zener voltage regulator for the following specifications: Output voltage 5 V, input voltage (12 ± 3) V, load current 20 mA, zener maximum wattage 500 mW and minimum zener current 2 mA.

(10+10 = 20 marks)

7A. Explain enhancement and depletion type FET with their transfer characteristics.

7B. Derive the expression for the voltage gain of common-source amplifier with the help of FET low frequency model.

7C. Explain what is CMRR.

(8+6+6 = 20 marks)

8A. Explain the emitter follower circuit and write the equation for A_I, A_V, R_i and R_o.

8B. Explain the source self-bias with fixed bias circuit of FET.

8C. Explain any clipper and clamper circuit.

(6+6+8 = 20 marks)

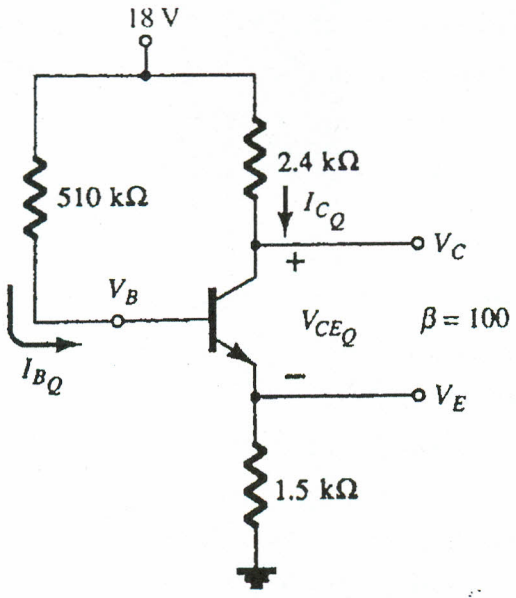

Fig Q.4B