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)

(OLD 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. Explain Superposition theorem and maximum theorem with any example.

1B. Explain thevinions equivalent circuit with any example.

(10+10 = 20 marks)

2A. 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.

2B. Compare half wave, full wave and bridge rectifier. With circuit diagrams input and output waveforms derive the equations for V_{dc}, I_{dc}, V_{rms}, I_{rms}, ripple factor and efficiency.

(10+10 = 20 marks)

3A. Explain the input / output characteristics of a CE mode transistors. Explain what region the transistor has to operate to work as switch amplifier.

3B. An AC voltage of 230V, 50Hz is applied to transformer having turns ratio 10:1. The secondary of transformer is connected to half wave rectifier. The diode has cut-in voltage 0.6V and forward resistance 10Ω. Determine average and rms values of output current and voltage. What should be the PIV rating of the diode?

(10+10 = 20 marks)

4A. Explain the working of Transistor as a switch. Explain the region of operation of transistor as a switch.

4B. For a fixed bias circuit, V_{CC} = 12 V and R_C = 4kΩ. The Ge transistor used is characterized by β = 50, I_{CEO} = 0 and V_{CEsat} = 0.2 V. Find the value of R_B that just results in saturation.

(10+10 = 20 marks)

5A. Explain the construction, operation and characteristics of Depletion MOSFET.

5B. 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)

6A. Determine v_o for the network shown in Fig Q6A for the input indicated. Explain the steps involved.

6B. Explain the construction and working of PN junction diode along with diode current equation and its VI characteristics under different bias conditions.

(10+10 = 20 marks)

7A. Explain the construction of JFET and its output and transfer characteristics.

7B. Briefly discuss the necessity of biasing. Explain the self bias circuit and derive the equations for I_B, I_C, and V_{CE}.

(10+10 = 20 marks)

8. **Write short notes on following:**

8A. JFET small signal model

8B. Emitter follower

8C. CMRR

8D. Darlington Amplifier

(5 marks × 4 = 20 marks)

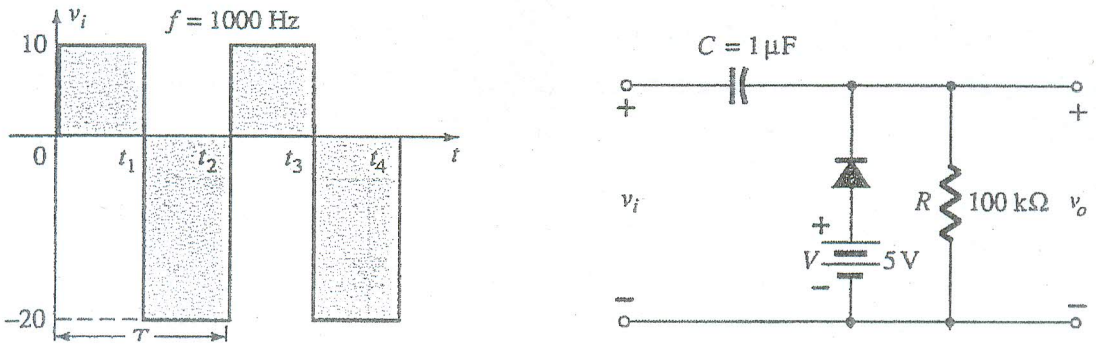

Fig 6A