Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

FIRST SEMESTER B.Tech. DEGREE END SEMESTER EXAMINATION
NOV/DEC 2017
SUBJECT: BASIC ELECTRONICS (ECE - 1001)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates
- Answer **ALL** questions.
- Missing data may be suitably assumed.

1A. With a neat circuit diagram draw and explain the input and output characteristics of a NPN transistor in CE configuration and indicate the regions of operation.

1B. For a fixed biased circuit with Si transistor operating at 25^0C given that R_B = 100 kΩ , R_C = 600Ω, V_{CC} = 12V and β = 100 determine the Q point.

1C. Draw the characteristics of S_i diode. And show the effect of temperature on diode characteristics.

(5+3+2)

2A. Draw the circuit diagram of a single stage RC coupled amplifier without feedback and explain the function of each of the component in the circuit. Sketch its frequency response and mention the salient features of the response.

2B. For a half wave rectifier circuit without filter, the rms value of voltage at the secondary of the transformer is 12V and R_L = 100Ω. If the diode is ideal, determine (a) Turns ratio of the transformer if the rms value of the line voltage is 220V. (b) DC output voltage (c) DC power delivered to the load.

2C. Draw the circuit diagram of a Zener voltage regulator. In a Zener voltage regulator if V_i = 16V, R_S = 3kΩ, V_Z = 10V and R_L = 1kΩ, determine i) V_0 ii) I_Z and iii) P_Z

(5+3+2)

3A. Write the truth table of full adder circuit. Obtain the expressions for sum & carry outputs. Implement full adder using two half - adders logic and other necessary logic gates.

3B. Simplify the logic function $F(A,B,C,D) = \Sigma m(0,1,2,5,6,8) + d(3,4,7,14)$ using K-map.

3C. Subtract $(65.15)_{10}$ from $(45.20)_{10}$ using 2's complement method.

(5+3+2)

4A. What are Sequential & Combinational circuits? Explain. Serial input data 11100110 is fed to the 4-bit shift register circuit from LSB. What will be the output for SIPO operation after 4^{th} clock pulse? How many clock pulses are required to shift MSB bit to the output. Also draw the circuit diagram.

4B. Find the carrier and modulating signal frequencies, the modulation index and the maximum deviation of the FM wave represented by $v(t) = 12\sin((6\times10^8 t) + 5\sin(1250t))$. Calculate the power delivered by this FM wave to a 10Ω resistor.

4C. Draw the block diagram of Digital Communication system.

(5+3+2)

5A. Define Amplitude Modulation. Obtain an expression for total power required to transmit AM Signal in terms of carrier power and modulation index. An AM transmitter transmits the signals at 100 kW with modulation depth of 80%. Calculate the total side band power in the transmitted signal.

5B. Illustrate ASK, FSK and PSK modulated signals with example.

5C. Write any four advantages of digital communication.

(5+3+2)