# North South University

## School of Engineering & Physical Sciences

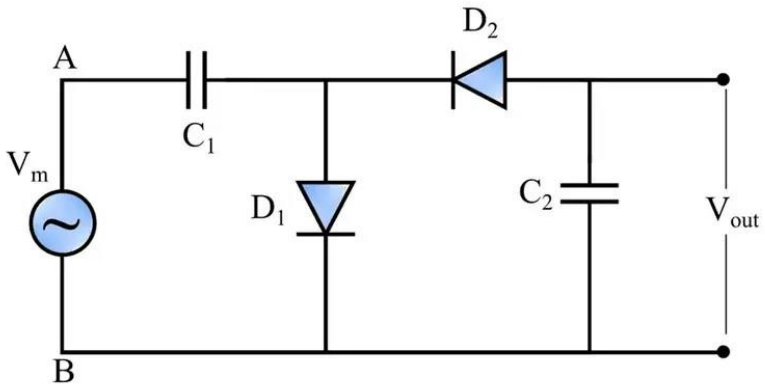
EEE 111/ ETE 111 Analog Electronics-I

Assignment-1 (Full marks-100)

1. Explain semiconductor doping and provide a concise overview of majority and minority carriers in both p-type and n-type semiconductors. [CO1] [10]

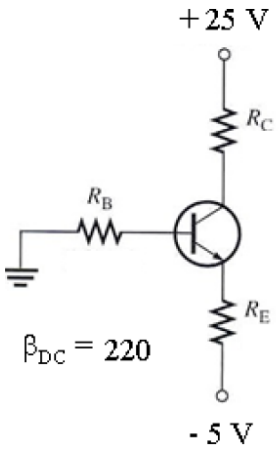
2. Explain the operational principle of a full-wave rectifier and deduce the formula for the average output voltage. Furthermore, explore the feasibility of constructing a DC power supply using the full-wave rectifier's output. If feasible, what supplementary components would be required, and outline the circuit's functionality. [CO1] [10]

3. Suppose a sinusoidal input voltage with a peak value of $V_m$ is applied to the following circuit. Sketch the output voltage waveform and describe the steps taken to attain this output voltage shape. [CO1] [20]




4. Determine the operating point ($V_{CEQ}$ and $I_{CQ}$) of the transistor for the following conditions- [CO2] [20]

(a) $R_B$= 330Ω , $R_E$ = 3KΩ , $R_C$= 1.6KΩ
(b) $R_B$= 150Ω , $R_E$ = 1KΩ , $R_C$= 1.6KΩ
(c) $R_B$= 150Ω , $R_E$ = 500Ω , $R_C$= 4 KΩ




5. Calculate $I_{CQ}$ and $V_{CEQ}$ for the following network where the value of $R_E$ = Sum of the digits of your student ID × 20. Also, the value of $V_{CC}$ = Sum of the digits of your student ID × $\frac{2}{3}$. [Example: $R_S$ for ID 2131951643 = (2 + 1 + 3 + 1 + 9 + 5 + 1 + 6 + 4 + 3) × 20 = 700 Ω; $V_{CC} = (2 + 1 + 3 + 1 + 9 + 5 + 1 + 6 + 4 + 3) \times \frac{2}{3} = 23.33\ V$]. [CO2] [40]