International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Examination Autumn-2018
Course Code: EEE-2411
Time: 2 hours 30 minutes

Program: B.Sc. Engg. (EEE)
Course Title: Electronics II
Full Marks: 50

Part A

[Answer any ***two*** questions from the followings; figures in the right margin indicate full marks.]

1(a). Explain the operation of Wien bridge oscillator and calculate its frequency of oscillation. 4

1(b). What is oscillator? Write down the conditions that must be maintained to produce an oscillation. 2

1(c). Explain the operation of Phase shift oscillator and calculate its frequency of oscillation. 4

2(a). In an ac amplifier, which capacitors affect the low-frequency gain? How is the high-frequency gain of an amplifier limited? 2

2(b). The bypass *RC* circuit is formed by C_2 and the resistance looking in at the emitter, $R_{in(emitter)}$, as shown in **Fig. 2.1**. Derive $R_{in(emitter)}$ with proper diagrams. 5

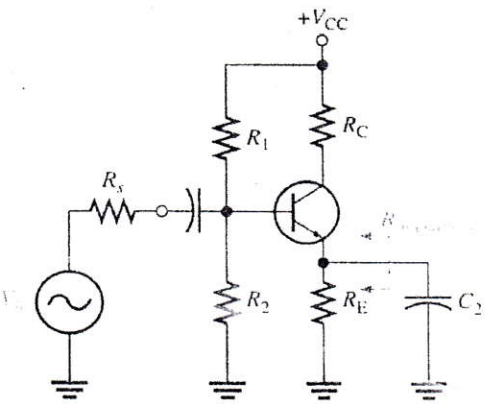

Fig. 2.1

2(c). The midrange voltage gain of a certain amplifier is 200. The input *RC* circuit has a lower critical frequency of 1 kHz. Determine the actual voltage gain at f = 1 kHz, f = 100 Hz, and f = 10 Hz. 3

3(a). Define the term : (i)Decibel (ii) Bode plot 2

3(b). Explain the operation of astable multivibrator using 555 timer. 5

3(c). Determine the amplitude and frequency of the saw tooth output in **Fig-3.1** (see page 2). Assume that the forward PUT voltage, V_F is 1V. Also sketch the output waveform. 3

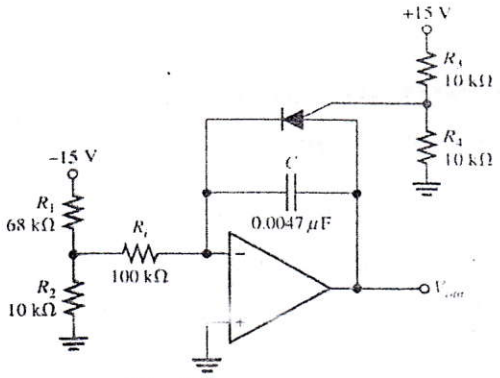

Fig. 3.1

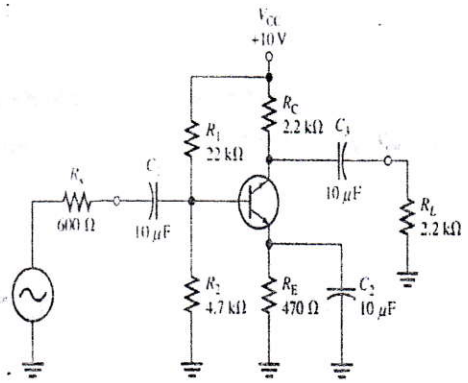

Fig. 4.1

Part B

[Answer any ***three*** questions from the followings; figures in the right margin indicate full marks.]

4(a). Derive the equivalent high-frequency input RC circuit for the BJT amplifier in **Fig. 4.1** (above). Use this to determine the upper critical frequency due to the input circuit. The transistor's datasheet provides the following: β = 120, Cbe = 20 pF and Cbc = 2.4 pF. 5

4(b). What is Bandwidth? What is the bandwidth of an BJT amplifier when $f_{cu(dom)}$ = 25 kHz and $f_{cl(dom)}$ = 100 Hz? 2

4(c). What dete ncy response of an amplifier? A c in amplifier has $f_{cu(input)}$ = 3.5 MHz and $f_{cu(output)}$ = 8.2 MHz. Which circuit dominates the h -frequency response? 3

5(a). What limits the passband of an active high-pass filter? 2

5(b). What is the primary purpose of cascading low-pass filters? Draw the circuit diagram of a th order low pass filter.

5(c). Determine the center frequency, maximum gain, and bandwidth for the filter in **Fig. 5.1** given bellow. 5

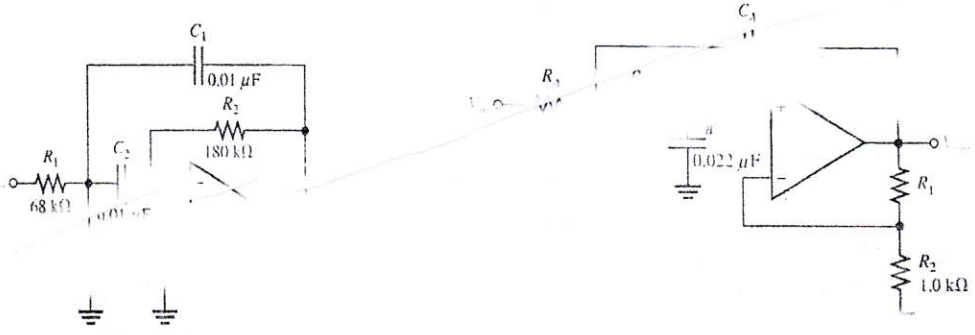

Fig. 5.1

6(a). Describe the construction of a sol cell. 6

6(b). Wri short on the follow Any two 4

Photo diod (ii) LED (iii) Photo con ive cell

7(a). What determines the high-frequ y response of an amplifier? Draw the circuit diagram of High-frequency equivalent t after applying Miller's theorem. 3

7(b). Name the basic parts of an active filter. If three two-pole high-pass filters and one single-pole high-pass filter are cascaded, what is the resulting roll-off? 3

7(c). Determine the critical frequency of the Sallen-Key low-pass filter in **Fig. 7.1** given above, and set the value of for an approximate Butterworth response. 4