**St Joseph’s College (Autonomous), Bangalore-27**

**B.Sc. Electronics – II Semester**

**Semester Examination: April 2020**

**Amplifiers and Oscillators EL-218**

Time: 2½ hrs Max.Marks:70

This paper contains **three** printed pages and **three** parts

**Part A**

Answer any five questions 8X5=40

1. a) Differentiate between cascade and cascode amplifier.

b) Explain the working of two stage RC coupled amplifier and derive an expression for voltage gain 2+6

1. a) With the necessary circuit explain the working of class B push pull amplifier and derive

b) Differentiate between voltage and power amplifier 6+2

1. a) What is Barkhausen criterion for oscillations?

b) With the necessary circuit explain the working of Hartley oscillator. Derive an expression for the frequency of oscillations. 2+6

1. a) Explain the working of astable multivibrator using transistors. Give the expression for frequency of oscillations

b) What is the need for voltage regulators? Name a variable voltage regulator IC 6+2

1. a) Derive an expression for voltage gain of dual input balanced output differential amplifier.

b) Give two characteristics of ideal and practical OPAMP. 6+2

1. a) Draw the block diagram of negative series feedback amplifier for OPAMP. Derive an expression for voltage gain for inverting and non-inverting OPAMP.

b) Explain the term virtual ground with respect to OPAMP. 6+2

1. a) What is a comparator?

b) Explain the working of Butterworth first order high pass filter. Draw the frequency response. 2+6

**Part B**

Answer any five questions 4X5=20

1. Calculate the voltage gain and input impedance of the circuit given below.

Given β1 = β2 = 100 ,Vin=1V



1. A class A CE amplifier operates from VCC = 20V draws a current ICQ = 5A and feeds a load of 40Ω through a step-up transformer of N1/N2 = 3.16. Find the efficiency of the amplifier when it is properly matched for maximum power supply.
2. In a Colpitt’s oscillator C1 = 0.001µF and C2 = 0.01 µF, L=10µH. Find the frequency of oscillations, feedback factor and voltage gain.
3. In an astable multivibrator using IC555 RA = 2.2kΩ RB = 6.8kΩ and C = 0.01 µF. Calculate (i) THigh (ii) TLow (iii) free running frequency and duty cycle.
4. The IC741 is configured as a non-inverting amplifier. The following data is given for the circuit. A = 400,000 R1 = 470Ω  Ri = 33MΩ RF = 4.7kΩ R0 = 60Ω. Supply voltage = ±15V. Calculate closed loop gain AF.
5. Design a differentiator to differentiate an input signal that varies in frequency from 10Hz to about 1kHz.
6. Design a band pass filter with fL = 400Hz fH = 2kHz and passband gain = 4.

**Part C**

Answer any five questions 2X5=10

1. Are power amplifiers large signal amplifiers? Justify your answer.
2. Draw the frequency response curve of tight and lose coupling of double tuned amplifier.
3. Name two AF oscillators.
4. Which multivibrator is used to store 1bit of memory?
5. Which ICs are used to get +5V and -12V ?
6. What is the difference between first order and second order active Butterworth filter?
7. Explain the terms CMRR and SVRR.