10.5 - Operational Amplifiers

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- (1998) Sketch the traces seen on the screen of a cathode ray oscilloscope when two sinusoidal potential differences of the same frequency and amplitude are applied simultaneously to X and Y plates of a cathode ray oscilloscope, when the phase difference between them is:
  - $0°$ $45°$ $90°$.
- (1999) Briefly describe the major factors that you would consider when designing a voltage amplifier.
- (1999) With the help of clear diagrams, explain how you would overcome thermal run away in a voltage amplifier.
- (2000) Mention any three uses of a CRO.
- (2000) What is an operational amplifier
- (2000) List three desirable features of an operational amplifier.
- (2000) In almost all cases, where an operation amplifier is used as a linear voltage amplifier, negative feedback is employed. State the advantage of negative feedback.
- (2007) Make well labelled diagram of the cathode ray oscilloscope and explain briefly how a sinusoidal voltage signal is displayed on its screen.
- (2007) Mention three (3) practical applications of the cathode ray oscilloscope.
- (2007) Explain the terms output saturation and negative feedback as applied to op-amplifiers.
- (2007) For an ideal operational amplifier, what are the values of the:
  - current into both inputs of the op-amp?
  - voltage between the inputs if the output is not saturated?
- (2007) What is a non-inverting amplifier?
- (2009) Explain the following terms:
  - Forward bias.
  - Reverse bias.
  - Inverting and non-inverting amplifier.

- (2009) An operational amplifier is to have a voltage gain of 100 . Calculate the required values for the external resistances R_1 and R_2 when the following gains are required:
  - non-inverting.
  - Inverting.
- (2013) Briefly explain why Cathode Ray Oscilloscope (C.R.O.) is said to be an excellent instrument for measuring the emf
- (2013) Draw a well labeled circuit diagram of an inverting amplifier.
- (2014) What is the purpose of amplifiers in a phone link?
- (2015) List three properties of operational amplifiers.
- (2015) What is meant by the term negative feedback? Give four advantages of using it in an op-amp or any type of voltage amplifier.
- (2015) Derive an expression of the closed loop gain for an inverting op-amp voltage amplifier with an input resistor R , and a feedback resistor.
- (2016) Explain the use of an op-amp as a summing amplifier.
- (2016) Name three electronic circuits in which multivibrators can be constructed.
  - List down three types of multivibrators.
  - Briefly explain the applications of multivibrators listed above.
- (2016) Mention two characteristics of op-amps.
- (2016) Briefly explain why op-amps are sometimes called differential amplifiers?
- (2016) Describe the structure and the mode of action of a simplified version of the Van de Graaff generator.
- (2017) Briefly explain the function of the following:
  - Oscilloscope
  - Op-amps
- (2017) A change of 100 A in the base current produces a change of 3 mA in the collector current. Calculate:
  - The current amplification factor, β
  - The current gain, α
- (2019) Distinguish between inverting OP-AMP and non-inverting OP-AMP.
  - Give one application of each type of OP-AMP described above.