# NK-111

November-2017

B.Sc., Sem.- V

## CC-301 : Electronics

Time : 3 Hours]

[Max. Marks : 70

1.  Attempt any **two** :  14

   (A) Draw the circuit diagram of an emitter coupled differential amplifier, explain its working. Derive the equation for differential mode gain, common mode gain and CMRR.

   (B) Discuss about the transverse characteristic of an OPAMP.

   (C) Explain the method to improve CMRR of the differential amplifier by using constant current source.

   (D) Explain the working of the level shifting circuit in an OPAMP.

2.  Attempt any two :  14

   (A) Draw the circuit of three input non-inverting summing amplifier using OPAMP. Derive the equation for output voltage.

   (B) Draw the circuit of a grounded load voltage to current converter using OPAMP. Explain its working.

   (C) Explain the use of OPAMP as an AC amplifier. Derive the equation of cut-off frequency.

   (D) Draw the circuit of full-wave rectifier using OPAMP and explain its working.

3.  Attempt any two :  14

   (A) Discuss about regulator protection techniques.

   (B) Draw the functional block diagram of 3-terminal regulator. Explain its function how it can be used as fixed positive voltage regulator.

   (C) Draw the circuit diagram of 3-terminal adjustable voltage regulator. Explain its working and show that the total change in output voltage is $dV_o = S\Delta V_o + R_o \Delta I_o$.

   (D) Draw function block diagram of voltage regulator IC-723. Explain the use of IC-723 as positive low voltage regulator and derive the equation of output voltage.

4. Attempt any **two** : 14

(A) Explain the different circuit schemes for switching regulators.

(B) Draw the circuit diagram of basic buck type switching regulator and show that for this circuit output voltage is proportional to duty cycle of switching frequency.

(C) For buck type switching regulator draw the waveform of switching voltage, inductor voltage, capacitor voltage and derive the equation for ripple voltage.

(D) For buck type switching regulator derive the equation for minimum load current and critical inductance.

5. Answer the following in brief : 14

(1) What is the function of the output stage in and OPAMP IC ?

(2) Define: Differential Mode Signal.

(3) Define : Common Mode Signal

(4) Why the name current mirror circuit is given ?

(5) Draw the circuit of a subtractor using OPAMP.

(6) What is the use of current to voltage converter circuit ?

(7) What is an instrumentation amplifier ?

(8) What is the advantage of OPAMP rectifier circuit over simple diode rectifier ?

(9) For what purpose voltage reference used in IC regulators ?

(10) What is tracking regulator ?

(11) What is current regulator ?

(12) What is mean by switching regulator ?

(13) What is mean by boost type regulator ?

(14) Give full form of SMPS.

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