2012

(1) Discuss the operation of op amp as an integrator. (5)

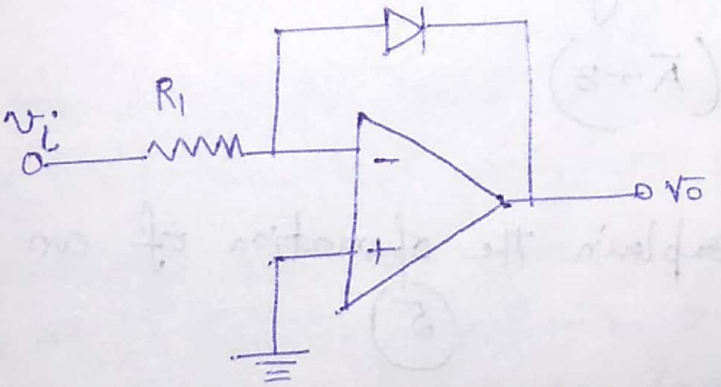
(2) (a) Implement the function $F = \overline{(AB+CD)}$ using NAND gates.

(b) $(11011)_2 = (?)_{10}$. (5)

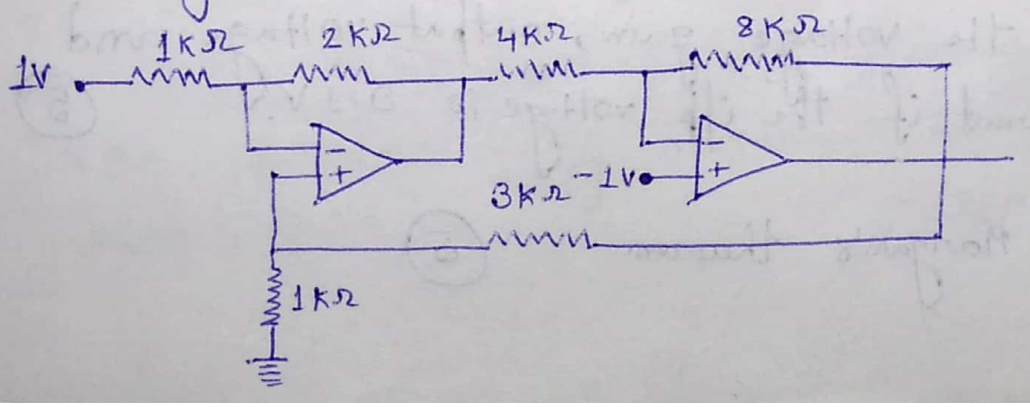
(3) (a) What is virtual ground of an op-amp. (2)

(b) Draw and explain the voltage comparator ckt using op-amp. (3)

(4) (a) If the feedback resistance R_f is replaced by a diode for a negative feedback amplifier using op-amp. then ~~derive~~ derive the expression of o/p voltage v_o for it. Also mention the type of application for this modification. (5)



(b) For the given ckt find the output voltage v_o. (5)



(5) Short notes :- 5+5

(a) Summing amplifier

(b) Design of EX-OR gate.

2013

(6) What is an op-amp ? Mention the properties of an ideal op-amp. What is type of feedback is used is an op-amp. adder ? (5)

(7) (a) Perform the following number conversions :-

(i) $(10110.1101)_2 = (?)_{10}$

(ii) $(143.3125)_{10} = (?)_2$

(8) Realize the Boolean expression using minimum number of NOR gates. (2)

$$Y = (A+\bar{B})(\bar{A}+B)$$

(9) (a) Draw and explain the operation of an op-amp integrator ckt. (5)

(b) An inverting amplifier has $R_f = 500\,K\Omega$, $R_i = 5\,K\Omega$ Determine the voltage gain, output voltage and input current if the i/p voltage is 0.1V. (5)

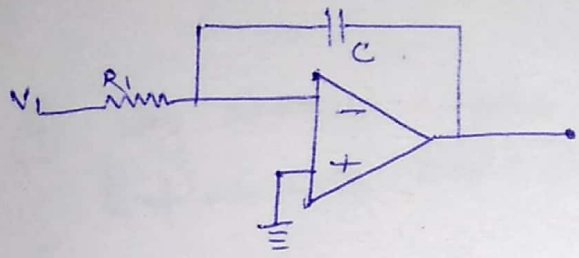
(10) SN De Morgan's theorem. (5)

2014

(1) Identify the ckt and find out the o/p voltage v_o of the ckt. (5)

$V_{in} = 5 \sin 2000\pi t$ mV.

$R = 100K\Omega$, $C = 1\ \mu F$.



(2) (a) $(ABC)_{16} = (?)_2$

(b) $(195)_8 = (?)_2$

(c) realize the boolean expression using minimum no. of NAND gate.

$Y = (A+\bar{B})(\bar{A}+\bar{B})$ 3+2

(3)(a) What are integrator and differentiator? Describe it with suitable block diagram. (5)

(b) The midrange open loop gain of a certain op-amp is 120 dB. Negative feedback reduces this gain by 50 dB. What is the close loop gain. (5)

(4) (a) Define truth table of XOR gate. Implement XOR operation using minimum no of 2 input NAND gate. 4+1

(b) If in an adder 3 input resistances are 2kΩ, 4Ω and 8kΩ. and the feedback resistance is 10kΩ. What is the o/p voltage. (5)

Short note

(5) (a) Universal gates.
(b) Operational amplifier

2015

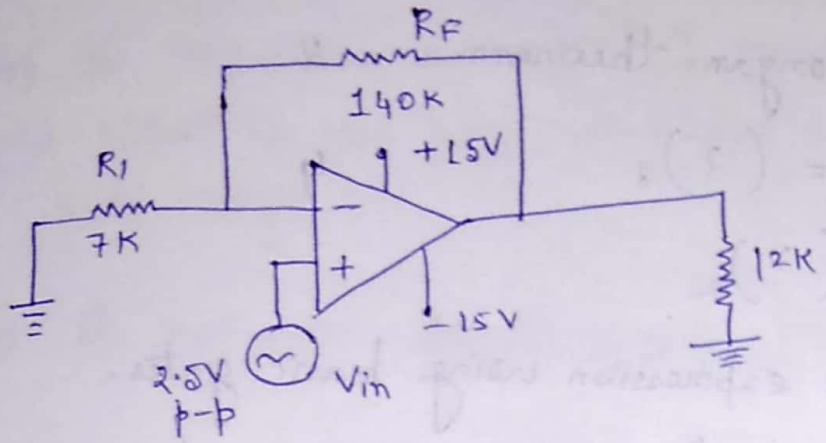
(1) Draw the block diagram of an op-amp. and write down the characteristics of an ideal op-amp. (5)

(2) (a) $(11011.1010)_2 = (?)_{10}$
(b) $(756.603)_8 = (?)_{16}$

(b) (c) Realize the boolean expression using minimum no of NOR gates

$$Y = (AB' + A'B.)$$

(3) obtain the closed loop gain, CMRR in dB and maximum operating freq for the non inverting amplifier shown in fig whose common mode gain is 0.003 and slew rate is 0.2 V/μs.



5

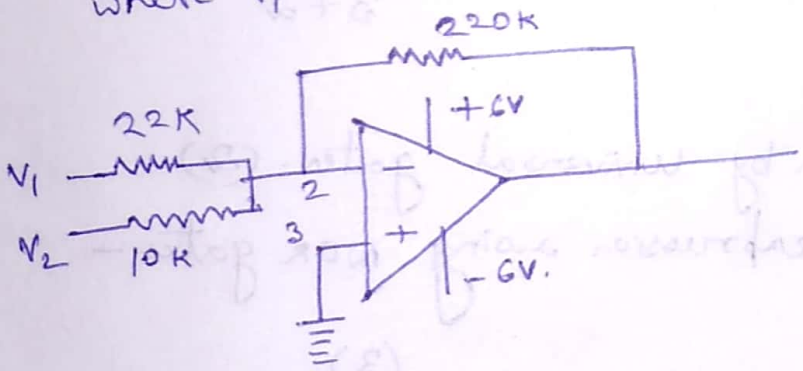
(4) Why NAND gate is called universal gate ? Explain with examples. (5)

(5) Short Notes :- (5)

op-amp as an ~~#~~ integrator.

2016.

(1) Identify the ckt and calculate the o/p voltage when $V_1 = 350\,mV$ and $V_2 = 200\,mV$. 1+4



(2)(a) Perform the following no conversions :- 3.

(i) $(456)_{16} = (?)_8$

(ii) $(1010101)_2 = (?)_{16}$.

(b) Realize the boolean expression using minimum no of NAND gates. 2

$$Y = (A+\bar{B})(\bar{A}+B)$$

(2) (a) Write down De Morgan theorem. 2.

(b) (i) $(11001.101)_2 = (?)_8$ 4

(ii) $(284.56)_{10} = (?)_2$

(c) Realize the boolean expression using basic gates.

$$Y = B(\bar{A}C + A\bar{C}) + A\bar{B}C.$$ 4

(3) Short Notes :- 5+5.

(a) Summing amplifier

(b) Race around condⁿ in JK latch.

2017

1. Mention the difference b/w ideal and practical op-amp. What do you mean by virtual ground of an op-amp. 3+2

2. (a) What do you mean by universal gates. (2)

(b) ~~Rel~~ Realize the expression using NOR gates -

$$Y = \bar{A}\bar{B} + AB.$$ (3)

(3) (a) Design an adder ckt using op-amp. to get the output expression as -

$$V_{out} = V_1 + 10V_2 + 100V_3$$

where V_1, V_2 and V_3 are i/p s ~~of~~ to the op-amp and $R_F = 100k$. (3)

(4) (b) How can an op-amp be used as an integrator. (4)

(c) What is an integrator ckt.? What are its advantages. (1+2)

(4) Sh. note → De Morgan's theorem.

Integrated ckt (Introduction)
op-amp and its terminal properties.

Application

(i) Inverting & Non inverting
(ii) Adder
(iii) Subtractor
(iv) constant gain amplifier
(v) Voltage follower
(vi) Comparator
(vii) Integrator
(viii) Differentiator

Logic gates and function realization with op-amps.