ELECTRONICS SOLUTIONS

GATE-2010

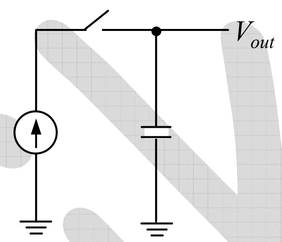
Q1. The voltage resolution of a 12-bit digital to analog converter (DAC), whose output varies from $-10\ V$ to $+10\ V$ is, approximately

(a) $1\ mV$ (b) $5\ mV$ (c) $20\ mV$ (d) $100\ mV$

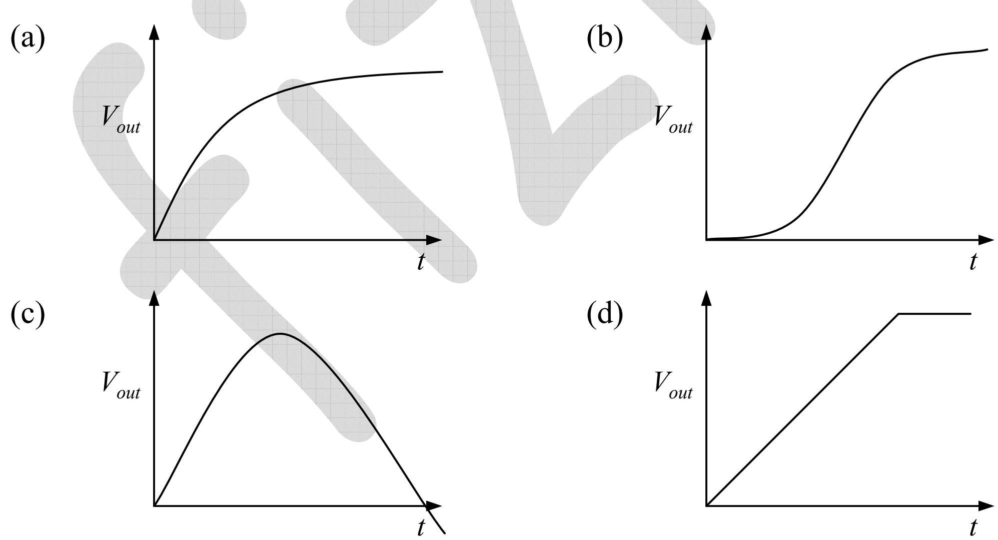
Ans: (b)

Solution: Voltage resolution$=\dfrac{20V}{2^{12}-1}=4.8\ mV$

Q2. The figure shows a constant current source charging a capacitor that is initially uncharged.



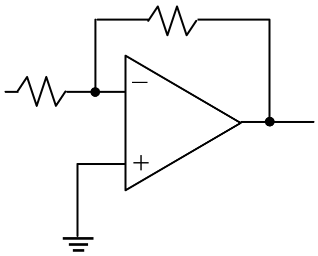
If the switch is closed at $t = 0$, which of the following plots depicts correctly the output voltage of the circuit as a function of time?

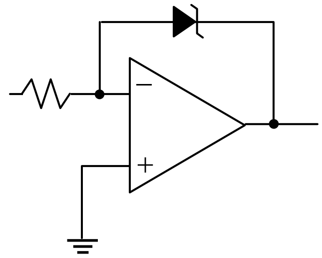


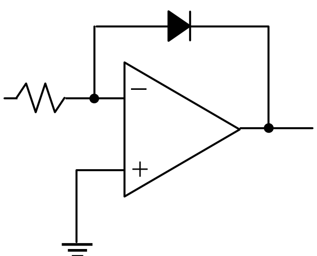
Ans: (d)

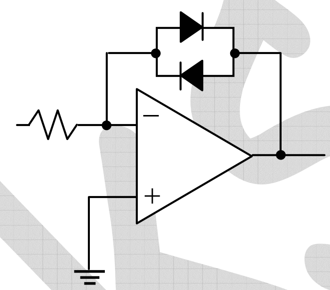
Solution: $I_0=\dfrac{CdV_0}{dt}\Rightarrow V_0=\dfrac{I_0}{C}t$

Q3. In one of the following circuits, negative feedback does not operate for a negative input. Which one is it? The opamps are running from ± 15 V supplies.

(a) 

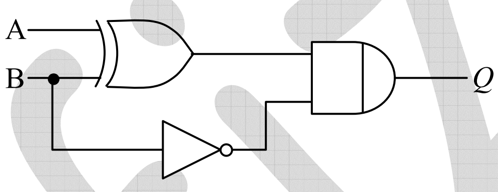
(b) 

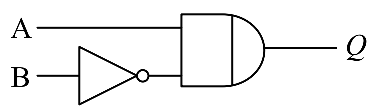
(c) 

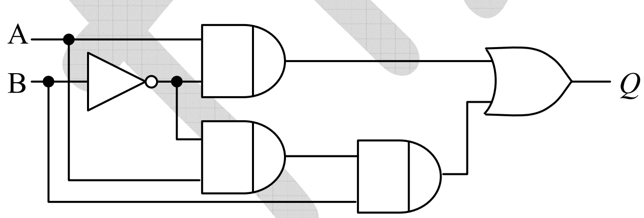
(d) 

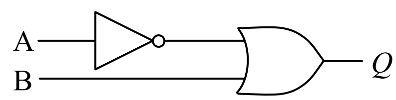
Ans: (c)

Q4. For any set of inputs, A and B, the following circuits give the same output, Q, except one. Which one is it?

(a) 

(b) 

(c) 

(d) 

Ans. : (d)

GATE-2011

Q5. Which of the following statements is **CORRECT** for a common emitter amplifier circuit?

(a) The output is taken from the emitter

(b) There is 180^o phase shift between input and output voltages

(c) There is no phase shift between input and output voltages

(d) Both *p-n* junctions are forward biased

Ans: (b)

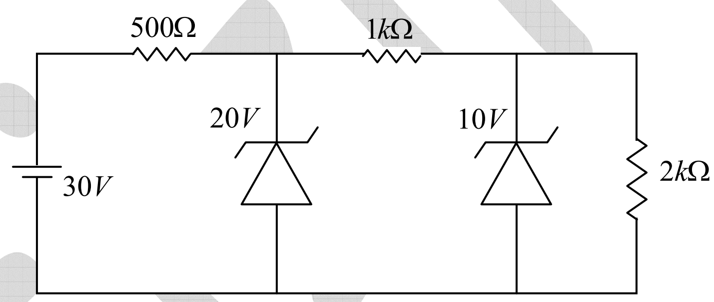
Q6. For an intrinsic semiconductor, m_e^* and m_h^* are respectively the effective masses of electrons and holes near the corresponding band edges. At a finite temperature the position of the Fermi level

(a) depends on m_e^* but not on m_h^* (b) depends on m_h^* but not on m_e^*

(c) depends on both m_e^* and m_h^* (d) depends neither on m_e^* nor on m_h^*

Ans: (c)

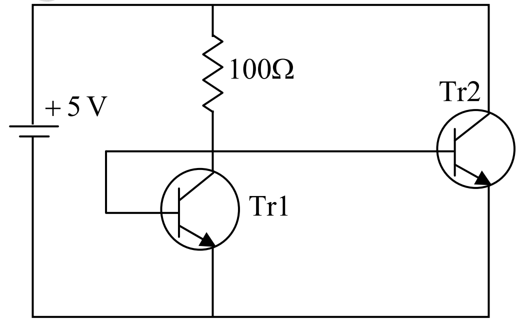
Q7. In the following circuit, the voltage across and the current through the 2 kΩ resistance are



(a) 20 V, 10 mA (b) 20 V, 5 mA (c) 10 V, 10 mA (d) 10 V, 5 mA

Ans: (d)

Q8. In the following circuit, Tr1 and Tr2 are identical transistors having V_{BE} = 0.7 V. The current passing through the transistor Tr2 is



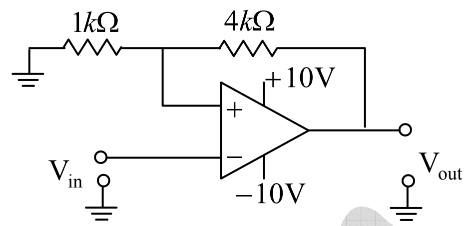
(a) 57 mA (b) 50 mA (c) 48 mA (d) 43 mA

Ans: (d)

Solution: Current through $100\,\Omega$, $I = \dfrac{5-0.7}{100} = 43\,mA$

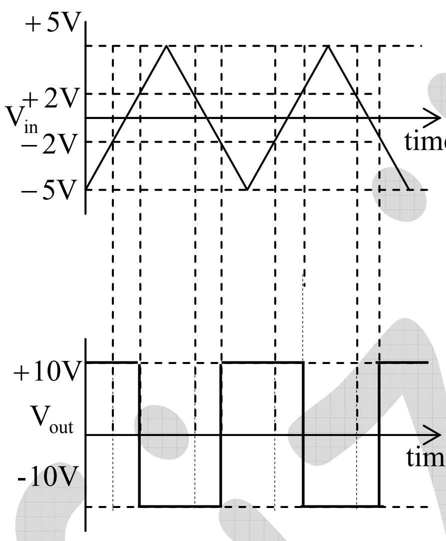
$$I = I_C + 2I_B \approx I_C = 43\,mA.$$

Q9. Consider the following circuit

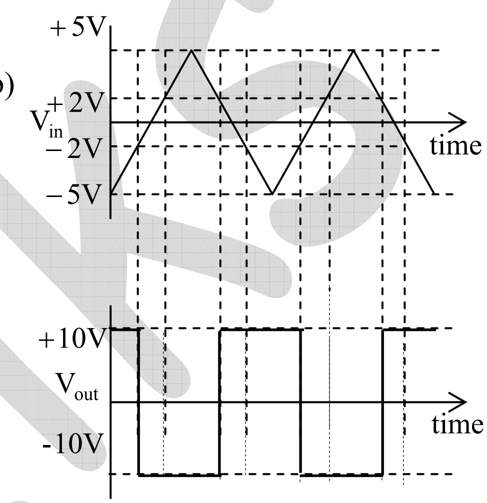


Which of the following correctly represents the output V_{out} corresponding to the input V_{in}?

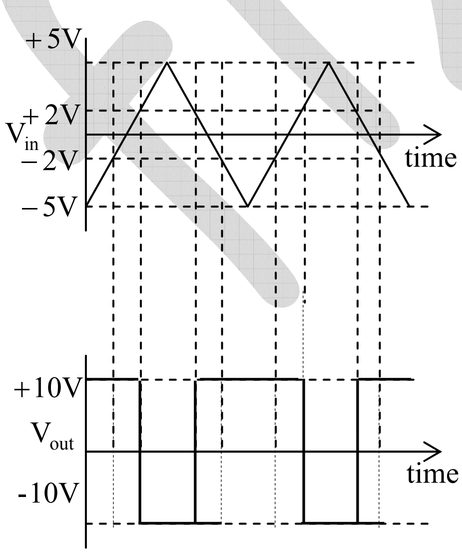
(a)



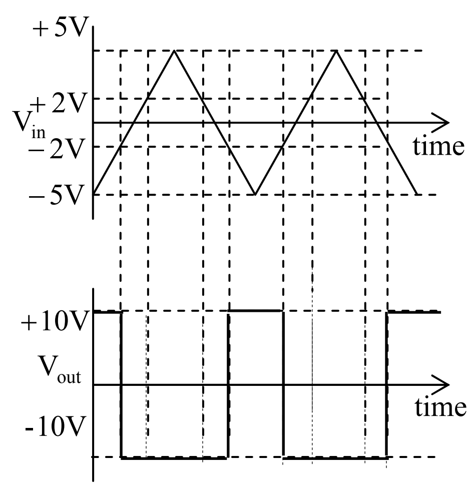
(b)



(c)



(d)



Ans: (a)

Solution: $V_{ut} = \left(\dfrac{1}{1+4}\right)\times 10 = +2V,\quad V_{lt} = \left(\dfrac{1}{1+4}\right)\times -10 = -2V.$

Q10. The following Boolean expression

$Y = A\cdot\overline{B}\cdot\overline{C}\cdot\overline{D} + \overline{A}\cdot B\cdot\overline{C}\cdot D + \overline{A}\cdot\overline{B}\cdot\overline{C}\cdot D + \overline{A}\cdot\overline{B}\cdot C\cdot D + \overline{A}\cdot B\cdot C\cdot D + A\cdot\overline{B}\cdot\overline{C}\cdot D$ can be simplified to

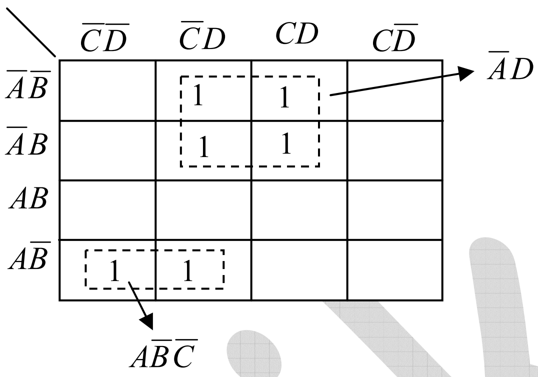
(a) $\overline{A}\bullet\overline{B}\bullet C + A\bullet\overline{D}$

(b) $\overline{A}\bullet B\bullet\overline{C} + A\bullet\overline{D}$

(c) $A\bullet\overline{B}\bullet\overline{C} + \overline{A}\bullet D$

(d) $A\bullet\overline{B}\bullet C + \overline{A}\bullet D$

Ans: (c)



GATE-2012

Q11. If the peak output voltage of a full wave rectifier is 10 V, its d.c. voltage is

(a) 10.0 V (b) 7.07 V (c) 6.36 V (d) 3.18 V

Ans: (c)

Solution: $V_{dc} = \frac{2V_m}{\pi} = \frac{2\times 10}{22/7} = \frac{14\times 10}{22} = \frac{70}{11} = 6.36V$

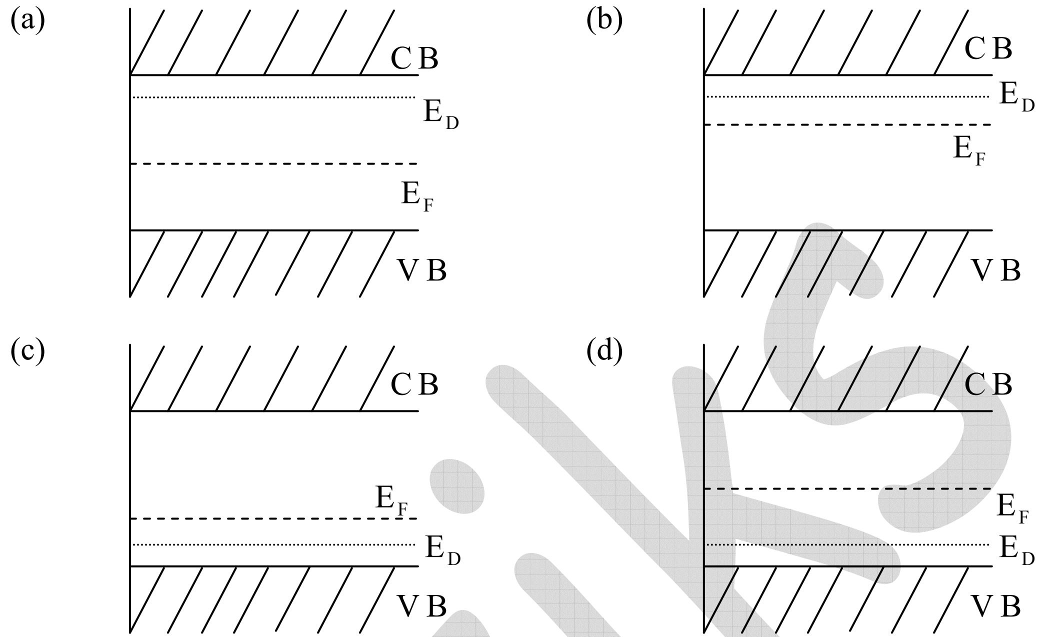
Q12. A *Ge* semiconductor is doped with acceptor impurity concentration of 10^{15} atoms/cm^3. For the given hole mobility of 1800 cm^2/V-s, the resistivity of the material is

(a) 0.288 Ω cm (b) 0.694 Ω cm (c) 3.472 Ω cm (d) 6.944 Ω cm

Ans: (c)

Solution: $\rho = \frac{1}{\sigma} = \frac{1}{N_A e u_h} = \frac{1}{10^{15}\times 1.6\times 10^{-19}\times 1800} = 3.47\Omega cm$

Q13. Identify the CORRECT energy band diagram for silcon doped with Arsenic. Here CB, VB, E_D and E_F are conduction band, valence band, impurity level and Fermi level, respectively.



Ans: (b)

Solution: N-type material (Si doped with A_S).

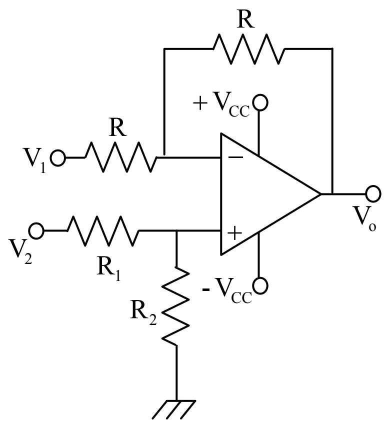
Q14. In the following circuit, for the output voltage to be $V_0 = \left(-V_1 + V_2/2\right)$ the ratio R_1/R_2 is

(a) 1/2

(b) 1

(c) 2

(d) 3



Ans: (d)

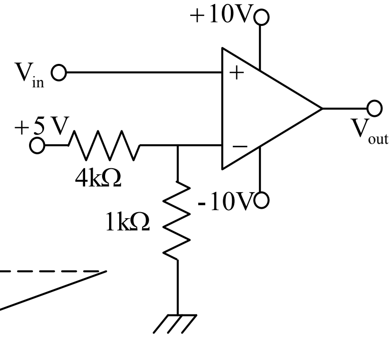
Solution: When $V_2 = 0, \quad v_{01} = -V_1$

when $V_1 = 0, \quad v_{02} = \left(1 + \frac{R}{R}\right)\left(\frac{R_2}{R_1 + R_2}\right)V_2$

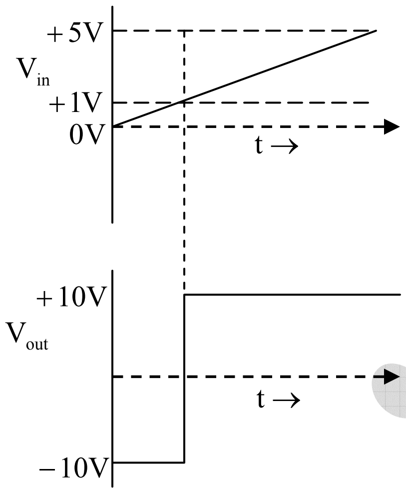
Since $V_0 = -V_1 + \frac{V_2}{2} \Rightarrow 2 \cdot \frac{R_2}{R_1 + R_2} = \frac{1}{2} \Rightarrow \frac{R_1}{R_2} = 3$

Q15. Consider the following OP-AMP circuit.

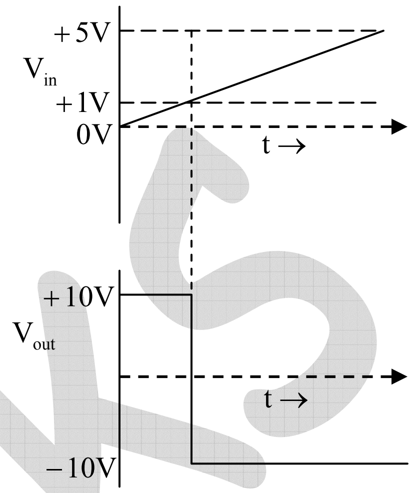
Which one of the following correctly represents the output V_{out} corresponding to the input V_{in}?



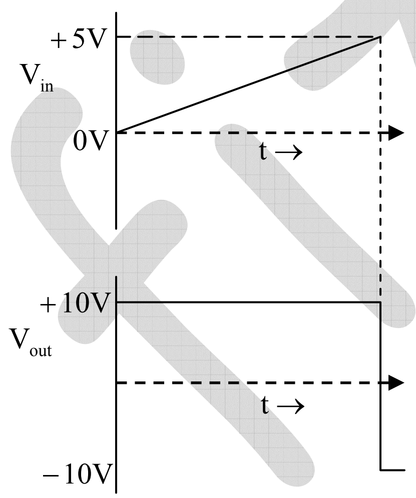
(a)



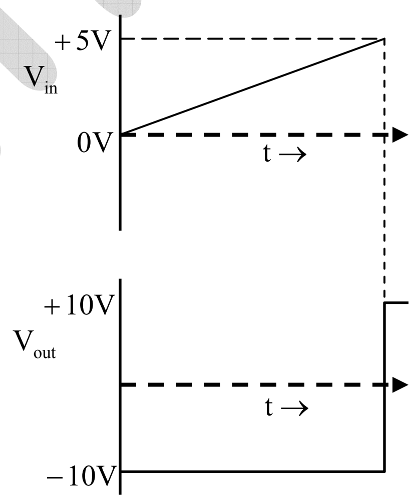
(b)



(c)



(d)

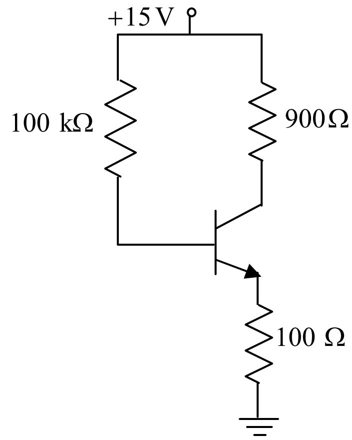


Ans: (a)

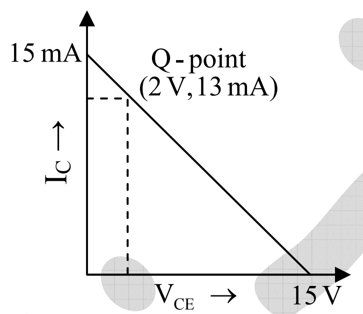
Solution: Voltage at inverting input $V_2 = \left(\frac{1}{1+4}\right) \times 5 = +1V$.

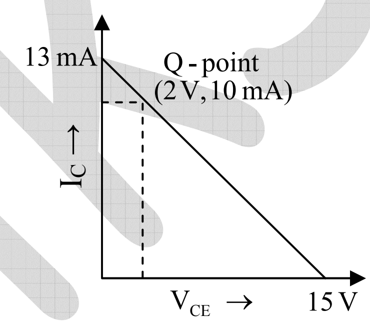
When $v_{in} > +1V$, $v_0 = +V_{CC}$ and when $v_{in} < +1V$, $v_0 = -V_{CC}$

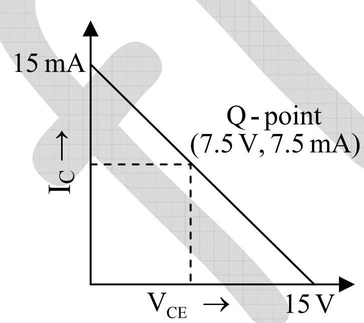
Q16. Consider the following circuit in which the current gain β_{dc} of the transistor is 100.

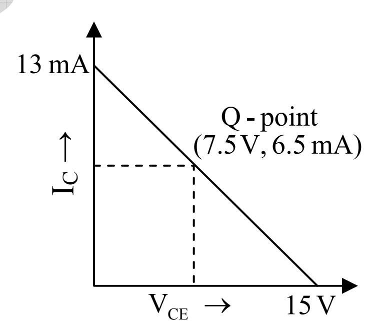


Which one of the following correctly represents the load line (collector current I_C with respect to collector-emitter voltage V_{CE}) and Q-point of this circuit?

(a)


(b)


(c)


(d)


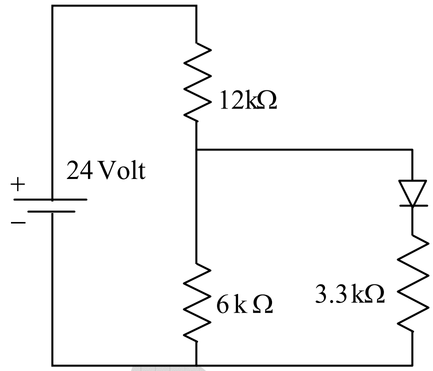
Ans: (a)

Solution: $I_B = \dfrac{V_{CC} - V_{BE}}{R_B + R_E} = \dfrac{15 - 0.7}{100 \times 10^3 + 100} \approx \dfrac{14.3}{100} mA.$

$$I_C \approx \beta I_B \approx 14.3mA \approx 13mA, V_{CE} = V_{CC} - I_C\left(R_C + R_E\right) = 15 - (900 + 100) \times 13 \times 10^{-3} = 2V.$$

$$I_{C,Sat} = \frac{\mathrm{V_{CC}}}{\mathrm{R_C} + R_E} = \frac{15}{1000} = 15\, mA.$$

Q17. In the following circuit, the voltage drop across the ideal diode in forward bias condition is 0.7V. The current passing through the diode is



(a) 0.5 mA

(b) 1.0 mA

(c) 1.5 mA

(d) 2.0 mA

Ans: (b)

Solution: Let current through $12k\Omega$ is I and through diode is I_D

Then $0.7 + I_D \times 3.3 = (I - I_D) \times 6$ (1)

and $-24 + I \times 12 + (I - I_D) \times 6 = 0$ (2)

From (1) and (2) $I_D \approx 1mA$.

<u>GATE-2013</u>

Q18. What should be the clock frequency of a $6-bit\ A/D$ converter so that its maximum conserved time is $32\mu s$?

(a) 1 MHz (b) 2 MHz (c) 0.5 MHz (d) 4 MHz

Ans: (c)

Q19. A phosphorous doped silicon semiconductor (doping density: $10^{17}/cm^3$) is heated from 100°C to 200°C. Which one of the following statements is CORRECT?

(a) Position of Fermi level moves towards conduction band

(b) Position of dopant level moves towards conduction band

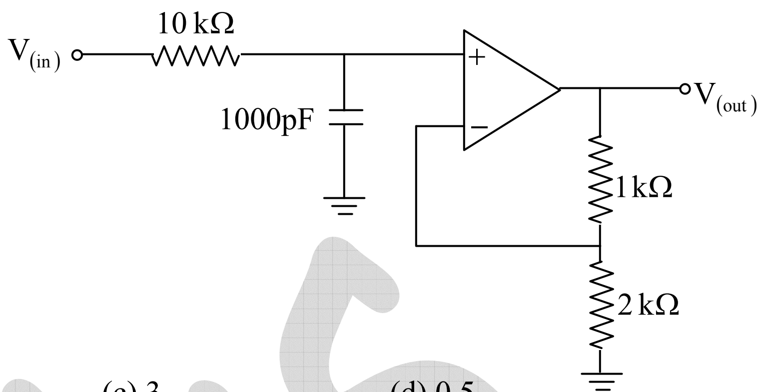
(c) Position of Fermi level moves towards middle of energy gap

(d) Position of dopant level moves towards middle of energy gap

Ans: (c)

Statement for Linked Answer Questions 20 and 21:

Consider the following circuit



Q20. For this circuit the frequency above which the gain will decrease by 20 dB per decade is

(a) 15.9 kHz (b) 1.2 kHz

(c) 5.6 kHz (d) 22.5 kHz

Ans: (a)

Solution: $f_H = \frac{1}{2\pi RC} = 16 kHz$

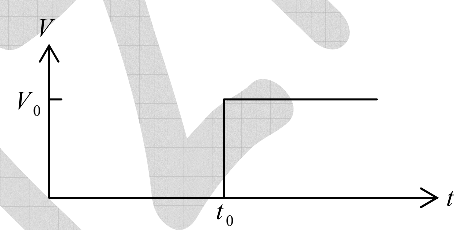
Q21. At 1.2 kHz the closed loop gain is

(a) 1 (b) 1.5 (c) 3 (d) 0.5

Ans: (b) $\left|\frac{v_0}{v_{in}}\right| = \frac{\left(1 + R_F/R_1\right)}{\sqrt{1 + \left(f/f_H\right)^2}} = 1.5$

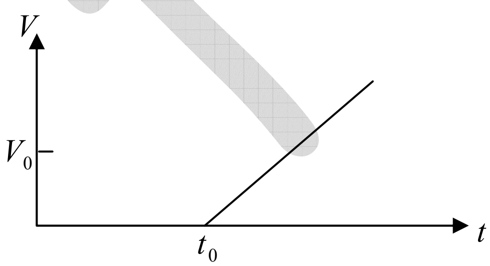
GATE-2014

Q22. The input given to an ideal OP-AMP integrator circuit is

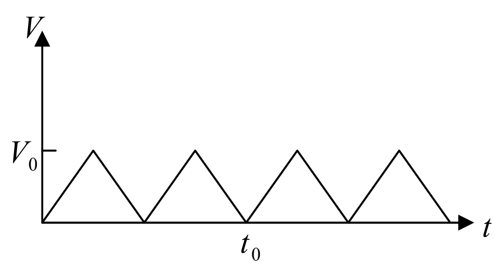


The correct output of the integrator circuit is

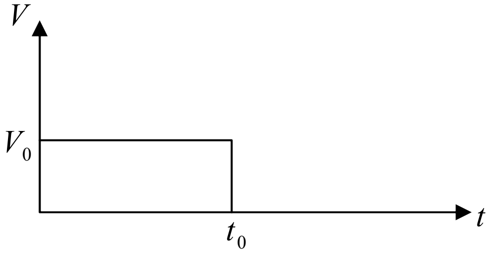
(a)



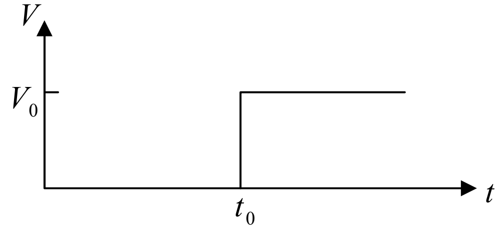
(b)



(c)



(d)



Ans: (a)

Q23. The minimum number of flip-flops required to construct a mod-75 counter is ________

Ans: 7

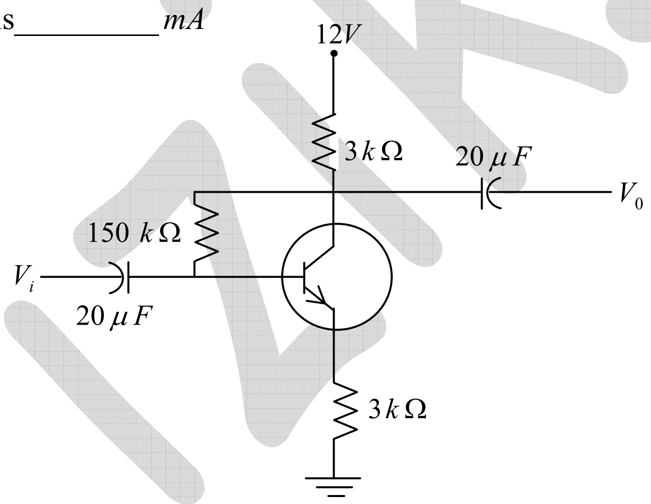
Q24. The donor concentration in a sample of n-type silicon is increased by a factor of 100. The shift in the position of the Fermi level at 300K, assuming the sample to non degenerate is ________ meV. $\left(k_B T = 25 meV\ at\ 300K\right)$

Ans: 115.15

Solution: $E_C - E_F = kT\ln\left(\frac{N_c}{N_d}\right)$ and $E_C - E_F' = kT\ln\left(\frac{N_c}{100N_d}\right) = kT\ln\left(\frac{N_c}{N_d}\right) - kT\ln(100)$

Thus shift is $\Delta E = kT\ln(100) = 25\ln(100)\,meV = 115.15\,meV$

Q25. The current gain of the transistor in the following circuit is $\beta_{dc} = 100$. The value of collector current I_C is________ mA



Ans: 1.6

Solution: $I_B = \frac{V_{CC} - V_{BE}}{R_B + \beta\left(R_C + R_E\right)} = \frac{12-0}{150 + 100(3+3)} = 0.016\,mA \Rightarrow I_C = \beta I_B = 1.6\,mA$

Q26. In order to measure a maximum of $1V$ with a resolution of $1mV$ using a $n-$ bit $\frac{A}{D}$ converter working under the principle of ladder network the minimum value of n is________

Ans: 10

Solution: $1\times10^{-3} = \frac{1}{2^n - 1} \Rightarrow n \approx 10$

Q27. A low pass filter is formed by a resistance R and a capacitance C. At the cut-off angular frequency $\omega_C = \frac{1}{RC}$ the voltage gain and the phase of the output voltage relative to the input voltage respectively are

(a) 0.71 and 45° (b) 0.71 and -45° (c) 0.5 and -90° (d) 0.5 and 90°

Ans: (b)

Solution: $\frac{v_0}{v_{in}} = \frac{X_C}{R+X_C} = \frac{1}{\frac{R}{X_C}+1} = \frac{1}{1+j\omega CR}$

At $\omega = \omega_C = \frac{1}{RC} \Rightarrow \frac{v_0}{v_{in}} == \frac{1}{1+j} = \frac{1}{\sqrt{2}e^{j45^0}} = \frac{1}{\sqrt{2}}e^{-j45^0}$

GATE-2015

Q28. The band gap of an intrinsic semiconductor is $E_g = 0.72\,eV$ and $m_h^* = 6m_n^*$. At $300\,K$, the Fermi level with respect to the edge of the valence band (in eV) is at _______(upto three decimal places) $k_B = 1.38\times10^{-23}\ JK^{-1}$

Ans.: 0.395

Solution: $E_i = \frac{E_c+E_v}{2} + \frac{3}{4}kT\ln\left(\frac{m_h^*}{m_n^*}\right)$

$$n_i = N_V e^{-(E_i-E_v)/kT} = \sqrt{N_c N_v}\, e^{-E_g/2kT} \Rightarrow e^{-(E_i-E_v)/kT} = \sqrt{\frac{N_c}{N_v}}e^{-E_g/2kT} \Rightarrow e^{(E_i-E_v)/kT} = \sqrt{\frac{N_v}{N_c}}e^{E_g/2kT}$$

$$\frac{E_i-E_v}{kT} = \ln\left(\sqrt{\frac{N_v}{N_c}}\right) + \frac{E_g}{2kT} = \ln\left(\frac{m_h^*}{m_e^*}\right)^{\frac{3}{4}} + \frac{E_g}{2kT} \Rightarrow E_i - E_v = \frac{3}{4}kT\ln(6) + \frac{E_g}{2}$$

$$\Rightarrow E_i - E_v = \frac{3}{4}\times0.026\times1.7917 + \frac{0.72}{2} = 0.3949eV \approx 0.395eV$$

Q29. Which one of the following DOES NOT represent an exclusive OR operation for inputs A and B?

(a) $(A+B)\overline{AB}$ (b) $A\overline{B} + B\overline{A}$ (c) $(A+B)(\overline{A}+\overline{B})$ (d) $(A+B)AB$

Ans.: (d)

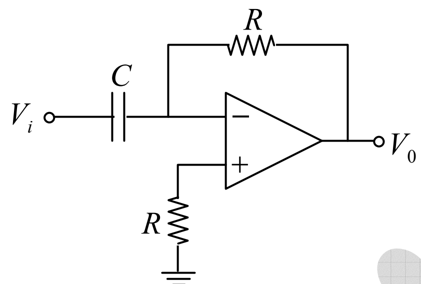
Solution: (a) $(A+B)\overline{AB} = (A+B)(\overline{A}+\overline{B}) = A\overline{B}+\overline{A}B$

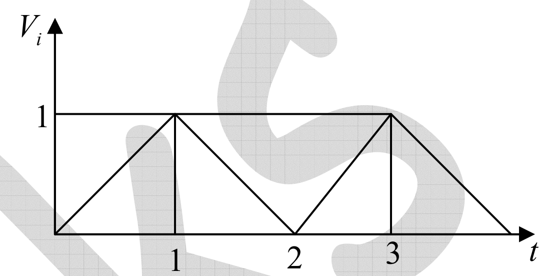
(b) $A\overline{B}+\overline{A}B$

(c) $A\overline{B}+\overline{A}B$

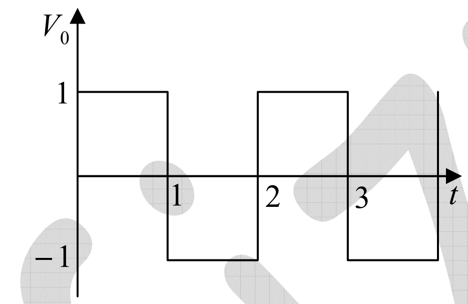
(d) $(A+B)AB = AB$

Q30. Consider the circuit shown in the figure, where $RC = 1$. For an input signal V_i shown below, choose the correct V_0 from the options:

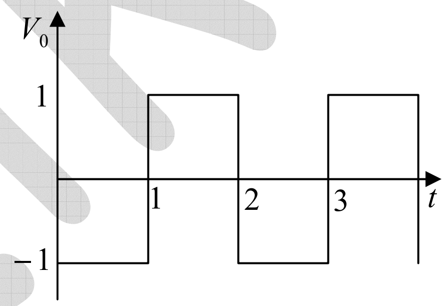




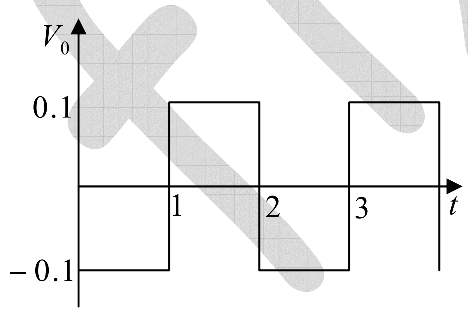
(a)



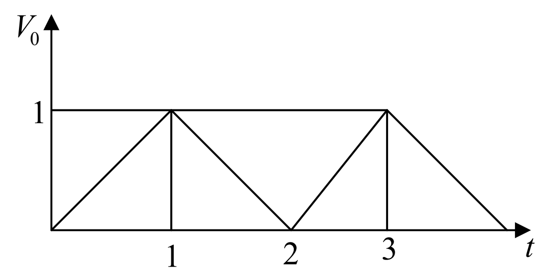
(b)



(c)



(d)

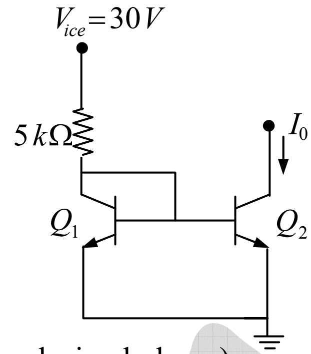


Ans.: (b)

Solution: $C\dfrac{dv_i}{dt} = \dfrac{0-v_0}{R} \Rightarrow v_0 = -RC\dfrac{dv_{in}}{dt} = -\dfrac{dv_{in}}{dt} \Rightarrow v_{in} = -v_0 t$

$v_{in} = +t \Rightarrow v_0 = -1V$ and $v_{in} = -t \Rightarrow v_0 = +1V$

Q31. In the simple current source shown in the figure, Q_1 and Q_2 are identical transistors with current gain $\beta = 100$ and $V_{BE} = 0.7V$

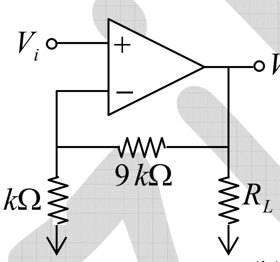


The current $I_0(\text{in } mA)$ is __________ (upto two decimal places)

Ans.: 5.86

Solution: $-V_{CC} + I_C R_C + V_{BE} = 0$, $I_C = \frac{30-0.7}{5} = \frac{29.3}{5} = 5.86\ mA$

Q32. In the given circuit, if the open loop gain $A = 10^5$ the feedback configurations and the closed loop gain A_f are



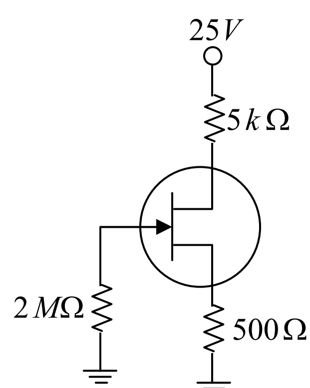
(a) series-shunt, $A_f = 9$ (b) series-series, $A_f = 10$

(c) series-shunt, $A_f = 10$ (d) shunt-shunt, $A_f = 10$

Ans.: (c)

Solution: $A_F = \left(1 + \frac{R_F}{R_1}\right) = (1+9) = 10.$

Q33. In the given circuit, the voltage across the source resistor is $1V$. The drain voltage (in V) is ___________



Ans.: 15

Solution: $V_S = I_D R_S \Rightarrow I_D = \frac{1}{500} A \Rightarrow V_D = V_{DD} - I_D R_D = 25 - \frac{1}{500} \times 5000 \Rightarrow V_D = 15V$

GATE-2016

Q34. The number density of electrons in the conduction band of a semiconductor at a given temperature is $2\times10^{19}\ m^{-3}$. Upon lightly doping this semiconductor with donor impurities, the number density of conduction electrons at the same temperature becomes $4\times10^{20}\ m^{-3}$. The ratio of majority to minority charge carrier concentration is________.

Ans : 400

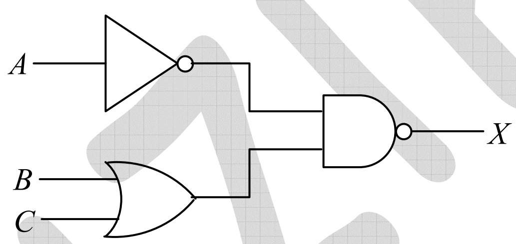
Solution: Intrinsic carrier concentration is $n_i = 2\times10^{19}\ m^{-3}$

Majority carrier concentration is $n = 4\times10^{20}\ m^{-3}$

Minority carrier concentration is $p = \frac{n_i^2}{n} = \frac{\left(2\times10^{19}\right)^2}{4\times10^{20}} = 10^{18}\ m^{-3}$

The ratio of majority to minority charge carrier concentration is $\frac{n}{p} = \frac{4\times10^{20}}{10^{18}} = 400$

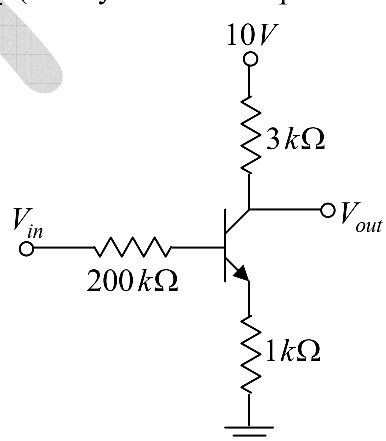
Q35. For the digital circuit given below, the output X is



(a) $\overline{\overline{A}+B.C}$ (b) $\overline{\overline{A}.(B+C)}$ (c) $\overline{A}.(B+C)$ (d) $A+\overline{(B.C)}$

Ans.: (b)

Q36. For the transistor shown in the figure, assume $V_{BE} = 0.7V$ and $\beta_{dc} = 100$. If $V_{in} = 5V$, V_{out} (in Volts) is _________. (Give your answer upto one decimal place)



Ans.: 5.7

Solution: $I_B = \frac{V_{in} - V_{BE}}{R_B + \beta R_E} = \frac{5 - 0.7}{200 + 100} = \frac{4.3}{300} mA$, $I_C = \beta I_B = 1.433\ mA$

$$V_{out} = V_{CC} - I_C R_C \Rightarrow V_{out} = 10 - 1.433 \times 3 = 5.7\ V$$

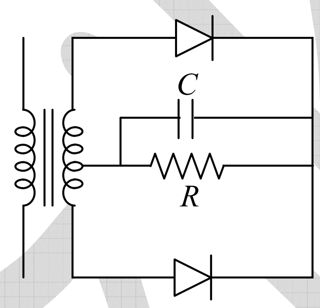
GATE-2017

Q37. The best resolution that a 7 bit A/D convertor with $5V$ full scale can achieve is…………… mV . (up to two decimal places)

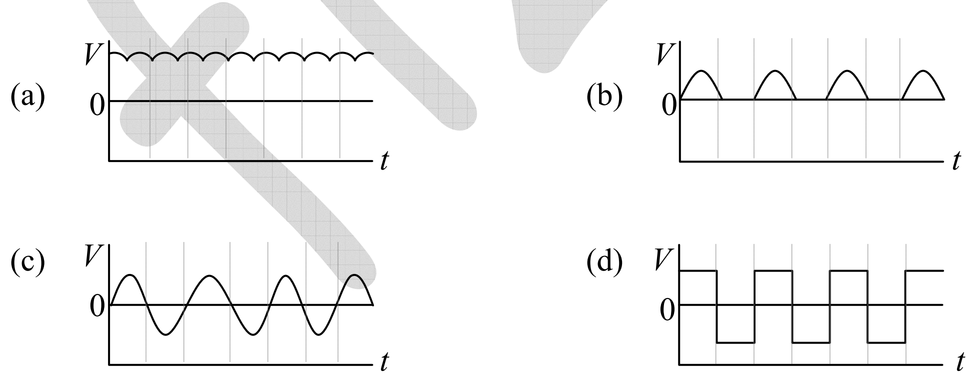
Ans. : 39.37

Solution: Resolution $= \frac{5}{2^7 - 1} = 39.37\ mV$

Q38. In the figure given below, the input to the primary of the transformer is a voltage varying sinusoidally with time. The resistor R is connected to the centre tap of the secondary.



Which one of the following plots represents the voltage across the resistor R as a function of time?



Ans. : (a)

Solution:

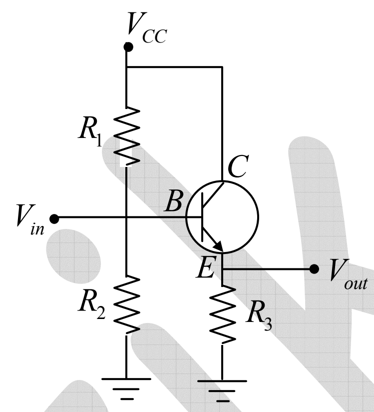
Full wave rectifier with RC filter.

Q39. The minimum number of NAND gates required to construct an OR gate is:

(a) 2 (b) 4 (c) 5 (d) 3

Ans. : (d)

Q40. For the transistor amplifier circuit shown below with $R_1 = 10\,k\Omega, R_2 = 10\,k\Omega, R_3 = 1\,k\Omega$, and $\beta - 99$. Neglecting the emitter diode resistance, the input impedance of the amplifier looking into the base for small ac signal is………… $k\Omega$. (up to two decimal places)

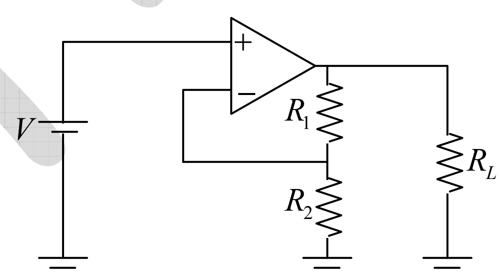


Ans. : 4.75

Solution: $Z_i = Z_b \,||\, R'$ where $Z_b \approx \beta R_3 = 99k\Omega$ and $R' = R_1 \,||\, R_2 = 5k\Omega$

$\Rightarrow Z_i = Z_b \,||\, R' = 4.75k\Omega$

Q41. Consider an ideal operational amplifier as shown in the figure below with $R_1 = 5\,k\Omega, R_2 = 1\,k\Omega, R_L = 100\,k\Omega$. For an applied input voltage $V = 10\,mV$, the current passing through R_2 is…………….. μA. (up to two decimal places)



Ans. : 10.0

Solution: $I_2 = \frac{V}{R_2} = \frac{10}{1} = 10\mu A$

GATE – 2018

Q42. The logic expression $\bar{A}BC + \bar{A}\bar{B}C + AB\bar{C} + A\bar{B}\bar{C}$ can be simplified to

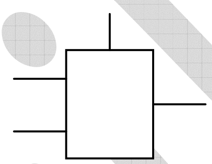
(a) A XOR C (b) A AND C (c) 0 (d) 1

Ans. : (a)

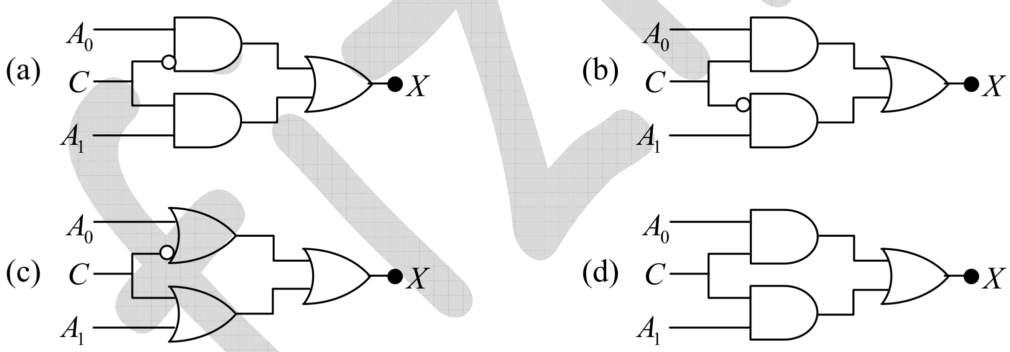
Solution: $Y = \bar{A}BC + \bar{A}\bar{B}C + AB\bar{C} + A\bar{B}\bar{C} = \bar{A}C\left(B + \bar{B}\right) + A\bar{C}\left(B + \bar{B}\right)$

$\Rightarrow Y = \bar{A}C + A\bar{C} = A \text{ XOR } C$

Q43. In a 2-to-1 multiplexer as shown below, the output $X = A_0$ if $C = 0$ and $X = A_1$ if $C = 1$.



Which one of the following is the correct implementation of this multiplexer?



Ans. : (a)

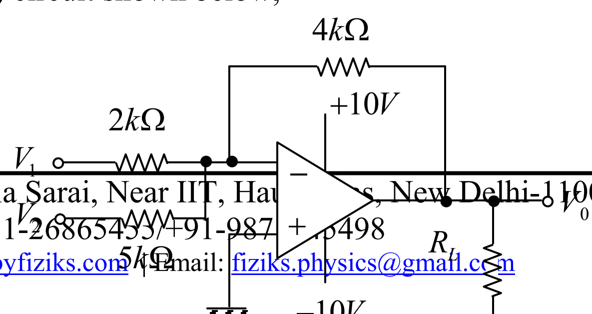
Solution: Check option (a),

$X = A_0\bar{C} + A_1C$

If $C = 0 \Rightarrow X = A_0$

If $C = 1 \Rightarrow X = A_1$

Q44. For an operational amplifier (ideal) circuit shown below,



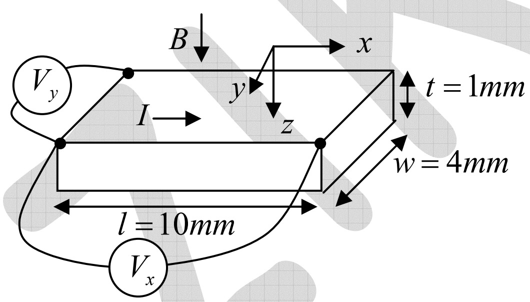
If $V_1 = 1V$ and $V_2 = 2V$, the value of V_0 is __________ V (up to one decimal place).

Ans. : -3.6

Solution: $V_0 = V_{01} + V_{02} = -\frac{4}{2}\times 1V - \frac{4}{5}\times 2V$

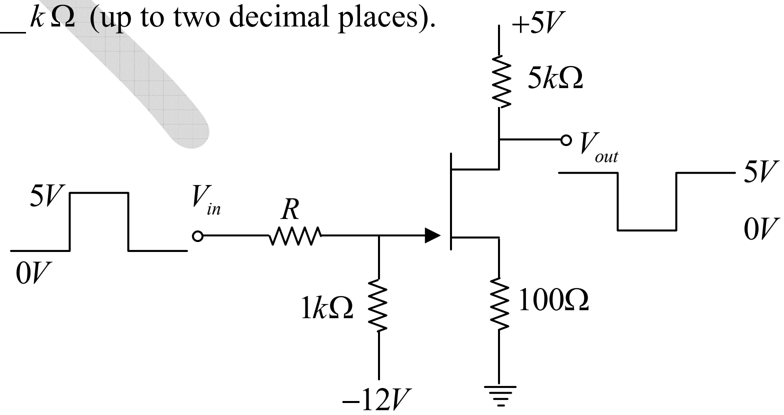
$V_0 = -2 - 1.6 = -3.6V$

Q45. A p - doped semiconductor slab carries a current $I = 100\,mA$ in a magnetic field $B = 0.2T$ as shown. One measures $V_y = 0.25\ mV$ and $V_x = 2\,mV$. The mobility of holes in the semiconductor is____________ $m^2V^{-1}s^{-1}$ (up to two decimal places)



Ans. : 1.55

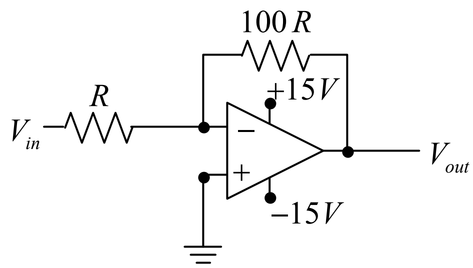
Q46. An n - channel FET having Gate-Source switch-off voltage $V_{GS(\text{OFF})} = -2V$ is used to invert a $0-5V$ square-wave signal as shown. The maximum allowed value of R would be __________ $k\Omega$ (up to two decimal places).



Ans. : 0.70

GATE-2019

Q47. For the following circuit, what is the magnitude of V_{out} if $V_{\text{in}} = 1.5V$?



(a) $0.015V$ (b) $0.15V$ (c) $15V$ (d) $150V$

Ans. : (c)

Solution: $V_{out} = -\dfrac{100R}{R} \times 1.5 = -150V \Rightarrow |V_0| = 15V$

Q48. Consider the following Boolean expression:

$$\left(\overline{A}+\overline{B}\right)\left[\overline{A\left(B+C\right)}\right]+A\left(\overline{B}+\overline{C}\right)$$

It can be represented by a single three-input logic gate. Identify the gate

(a) AND (b) OR (c) XOR (d) NAND

Ans. : (d)

Solution: $Y = \left(\overline{A}+\overline{B}\right)\left[\overline{A\left(B+C\right)}\right]+A\left(\overline{B}+\overline{C}\right)$

$$Y = \left(\overline{A}+\overline{B}\right)\left[\overline{A}+\overline{\left(B+C\right)}\right]+A\overline{B}+A\overline{C}$$

$$=\left(\overline{A}+\overline{B}\right)\left[\overline{A}+\overline{B}\,\overline{C}\right]+A\overline{B}+A\overline{C}$$

$$=\overline{A}+\overline{A}\,\overline{B}\,\overline{C}+\overline{A}\,\overline{B}+\overline{B}\,\overline{C}+A\overline{B}+A\overline{C}$$

$$=\overline{A}+\overline{A}\,\overline{B}\,\overline{C}+\overline{B}\,\overline{C}+\overline{A}\,\overline{B}+A\overline{B}+A\overline{C}$$

$$=\overline{A}+\overline{B}\,\overline{C}+\overline{B}+A\overline{C}=\overline{A}+\overline{B}+A\overline{C}$$

$$=\left(\overline{A}+A\overline{C}\right)+\overline{B}=\left(A+\overline{\overline{A}}\,\overline{C}\right)+\overline{B}=\overline{A}+\overline{C}+\overline{B}$$

$$Y=\overline{ABC}$$

Q49. A 3- bit analog-to-digital converter is designed to digitize analog signals ranging from $0V$ to $10V$. For this converter, the binary output corresponding to an input of $6\ V$ is

(a) 011 (b) 101 (c) 100 (d) 010

Ans. : (c)

Solution: $0 \rightarrow (000) \rightarrow 0V$

$$1 \rightarrow (001) \rightarrow \frac{10}{7} = 1.42V$$

$$2 \rightarrow (010) \rightarrow \frac{20}{7} = 2.8V$$

$$3 \rightarrow (011) \rightarrow \frac{30}{7} = 4.28V$$

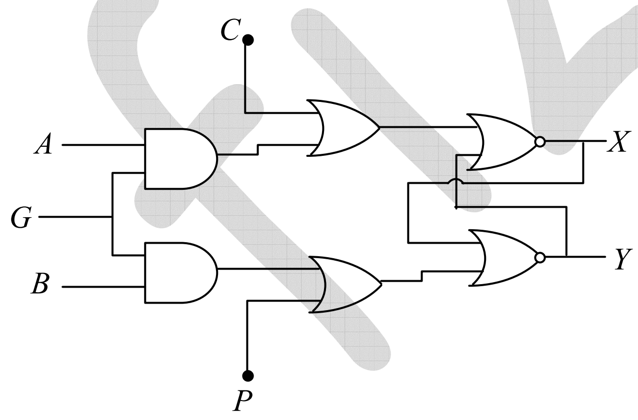
$$4 \rightarrow (100) \rightarrow \frac{40}{7} = 5.71V$$

$$5 \rightarrow (101) \rightarrow \frac{50}{7} = 7.14V$$

$$6 \rightarrow (110) \rightarrow \frac{60}{7} = 8.57V$$

$$7 \rightarrow (111) \rightarrow \frac{70}{7} = 10V$$

Q50. For the following circuit, the correct logic values for the entries X_2 and Y_2 in the truth table are



G	A	B	P	C	X	Y
1	0	1	0	0	0	1
0	0	0	1	0	X_2	Y_2
1	0	0	0	1	0	1

(a) 1 and 0 (b) 0 and 0 (c) 0 and 1 (d) 1 and 1

Ans. : (a)