XLL PHYSICS PUBLIC IMPORTANT COMPULSORY QUESTIONS -2024

UNIT -10

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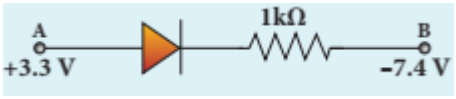
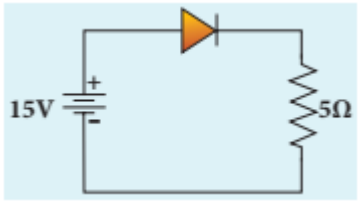
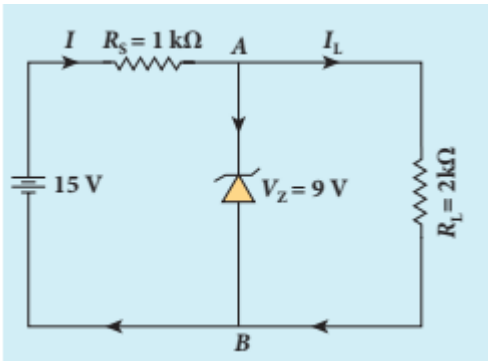
1.A silicon diode is connected with 1kΩ resistor as shown. Find the value of current flowing through *AB*



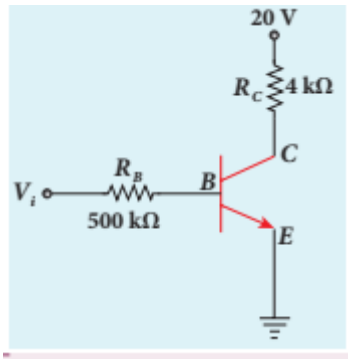
2. An ideal diode and a 5 Ω resistor are connected in series with a 15 V power supply as shown in figure below. Calculate the current that flows through the diode



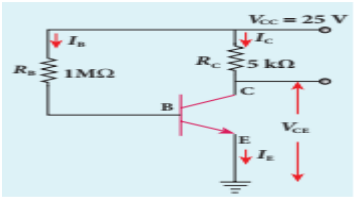
3. Find the current through the Zener diode when the load resistance is 2 kΩ. Use diode approximation.



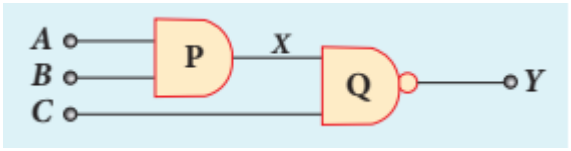
4. In the circuit shown in the figure, the inputvoltage *Vi* is 20 V, *VBE* = 0 V and *VCE* = 0 V. What are the values of *I B*, *IC*, β?



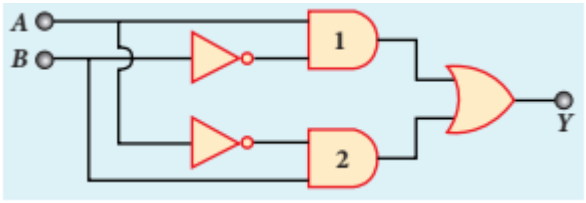
5. The current gain of a common emitter transistor circuit shown in figure is 120. Draw the DC load line and mark the *Q* point on it. (*VBE* to be ignored).



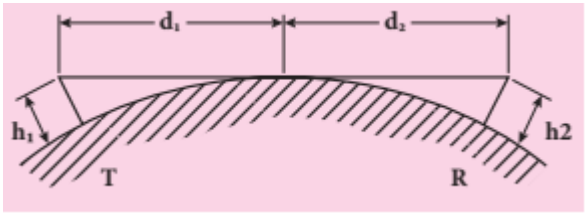
6. What is the output *Y* in the following circuit, when all the three inputs *A*, *B*, and *C* are first 0 and then 1?



7. In the combination of the following gates, write the Boolean equation for output *Y* in terms of inputs *A* and *B*.



8. A transmitting antenna has a height of 40 m and the height of the receiving antenna is 30 m. What is the maximum distance between them for line-of-sight communication? The radius of the earth is 6.4×10^6 m



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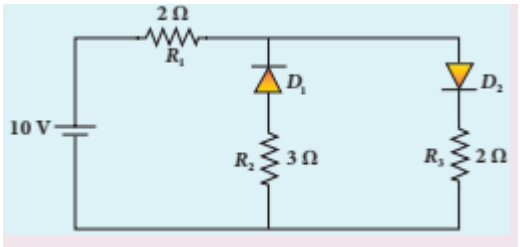
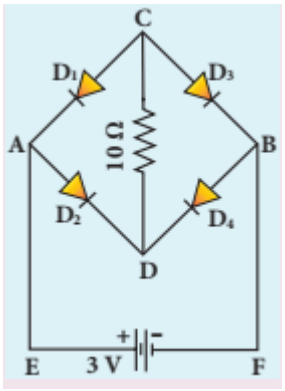
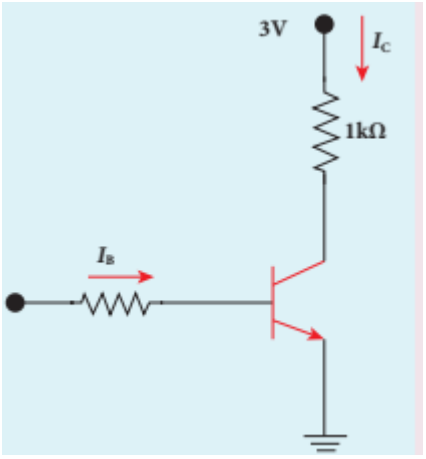
9. The given circuit has two ideal diodes connected as shown in figure below. Calculate the current flowing through the resistance *R*1



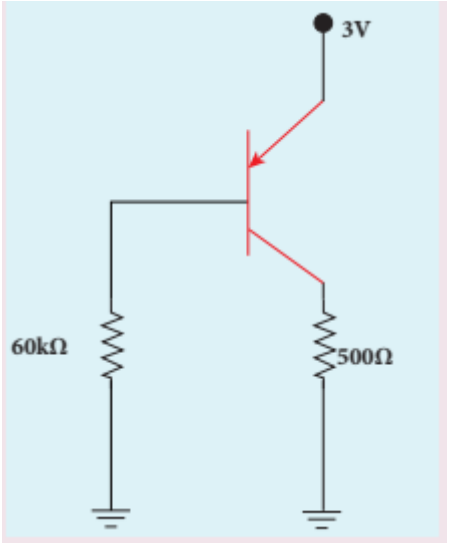
10. Four silicon diodes and a 10 Ω resistor are connected as shown in figure below. Each diode has a resistance of 1Ω. Find the current flows through the 10Ω resistor



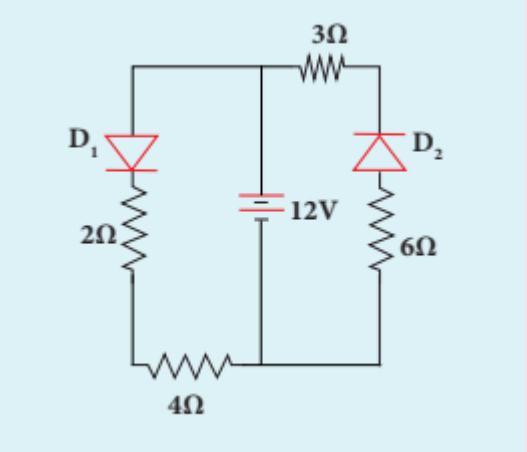
11. Assuming *V*CEsat = 0.2 V and β = 50, find the minimum base current (*I*B) required to drive the transistor given in the figure to saturation.



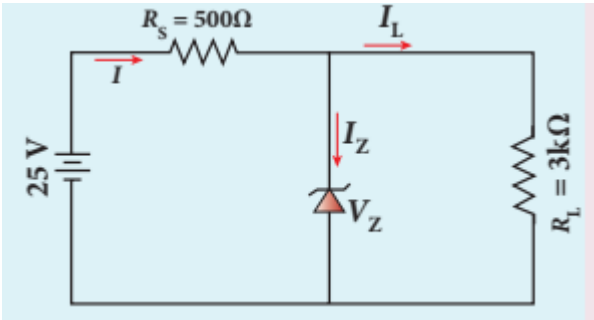
12. In the circuit shown in the figure, the BJT has a current gain (β) of 50. For an emitter – base voltage VEB = 600 mV, calculate the emitter – collector voltage VEC (in volts).



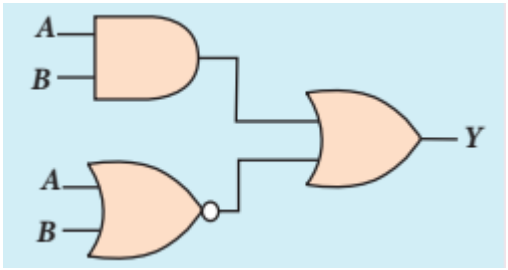
13. Determine the current flowing through 3Ω and 4Ω resistors of the circuit given below. Assume that diodes *D*1 and *D*2 are ideal diodes.



14. In the given figure of a voltage regulator, a Zener diode of breakdown voltage 15V is employed. Determine the current through the load resistance, the total current and the current through the diode. Use diode approximation.



15. Write down Boolean equation for the output Y of the given circuit and give its truth table



17. Prove the following Boolean expressions using the laws and theorems of Boolean algebra.

i) $(A+B)\,(A+\overline{B}) = A$

ii) $A(\overline{A}+B) = AB$

iii) $(A+B)\,(A+C) = A+BC$

18. Verify the given Boolean equation $A + \overline{A}B = A + B$ using truth table

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