

# QB365 Question Bank Software Study Materials

## Electronics and Communication Important 2 Marks Questions With Answers (Book Back and Creative)

12th Standard

Physics

Total Marks : 40

2 Marks

20 x 2 = 40

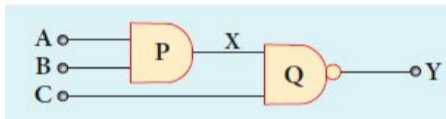
- 1) Explain centre frequency or resting frequency in frequency modulation.

**Answer :** When the frequency of the baseband signal is zero (no input signal), there is no change in the frequency of the carrier wave. It is at its normal frequency. This is called centre frequency or resting frequency.

- 2) A diode is called as a unidirectional device. Explain.

**Answer :** When a PN junction diode is forward biased, the depletion region decreases and the diode conduct once after the barrier potential is crossed, when it is reverse biased the depletion region increases and the diode does not conduct sci it is called as unidirectional device.

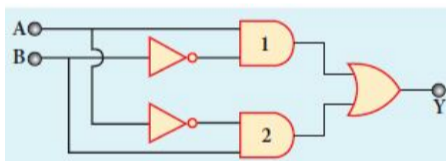
- 3) What is the output Y in the following circuit, when all the three inputs A, B, and C are first 0 and then 1?



**Answer :**

A	B	C	X = A.B	Y = X.C
0	0	0	0	1
1	1	1	1	0

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



**Answer :** The output at the 1<sup>st</sup> AND gate :  $A\bar{B}$

The output at the 2<sup>nd</sup> AND gate :  $\bar{A}B$

The output at the OR gate:  $Y = A.\bar{B} + \bar{A}.B$

- 5) Prove the Boolean identity  $AC + ABC = AC$  and give its circuit description.

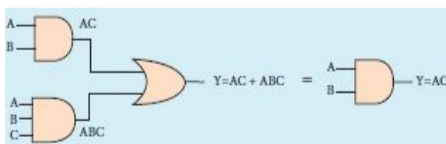
**Answer :** Step 1:  $AC(1 + B) = AC.1$  [OR law-2]

Step 2:  $AC . 1 = AC$  [AND law - 2]

Therefore,  $AC + ABC = AC$

Thus the Boolean identity is proved.

Circuit Description



- 6) Why can't we interchange the emitter and collector even though they are made up of the same type of semiconductor material?

**Answer :** Because of the differing size and the amount of doping, the emitter and collector cannot be interchanged.

- 7) What is an integrated circuit?

**Answer :** It is also referred as an IC. It consists of thousands to millions of transistors, resistors, capacitors etc. integrated on a small flat piece of semi conductor material that is normally silicon.

- 8) What is modulation?

**Answer :** The process of superimposing low frequency baseband signal onto a high frequency radio signal is called modulation.

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

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

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

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

**Answer :** (i)  $(A + B)(A + \bar{B}) = AA + AB + BA + B\bar{B} \quad (\because AA = A)$

$= A + AB + B$

$= A + AB + B = A(1 + B) + B \quad (\because AB + AB = AB)$

$= A + B \quad (\because 1 + B = 1)$

(ii)  $A(\bar{A} + B) = A\bar{A} + AB = AB \quad (\because A\bar{A} = 0)$

(iii)  $(A + B)(A + C) = AA + AC + BA + BC$

$= A + AC + BA + BC$

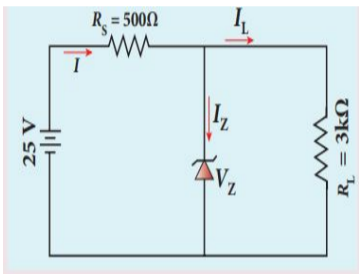
$= A(1 + C) + BA + BC$

$= A + BA + BC$

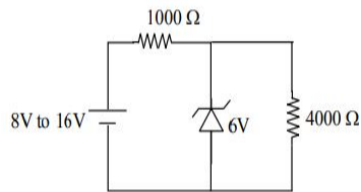
$= A(1 + B) + BC \quad (\because 1 + C = 1)$

$= A + BC \quad (\because 1 + B = 1)$

10) 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.



**Answer :**



Voltage across Zener diode = 15 V

Therefore, current in  $3k\Omega = \frac{V}{R} = \frac{15}{3 \times 10^3}$

$= 5 \times 10^{-3} = 5 \text{ mA}$

Voltage across  $500 \Omega = 25 - 15 = 10 \text{ V}$

Therefore, current in  $500 \Omega = \frac{10}{500} = 20 \text{ mA}$

Therefore, current in Zener diode =  $20 - 5 = 15 \text{ mA}$

11) Define internal field emission or field ionization.

**Answer :** The process of emission of electrons due to the rupture of bands in from the lattice due to strong electric field is known as internal field emission or field ionization.

12) Write the demerits of fiber optic communication?

**Answer :** (i) Fiber optic cables are more fragile when compared to copper wires.  
(ii) It is an expensive technology.

13) What do you mean by forbidden energy gap?

**Answer :** The energy gap between the valence band and the conduction band is called forbidden energy gap.

14) What is threshold voltage or cut - in voltage or knee voltage?

**Answer :** In a forward characteristics of a diode at room temperature, a potential difference equal to the barrier potential is required before a reasonable forward current starts flowing across a diode. This voltage is known as threshold voltage.

15) Define forward current gain ( $\alpha_{de}$ ) of a transistor

**Answer :** The ratio of the collector current to the emitter current is called the forward current gain of a transistor.

$\alpha_{de} = \frac{I_C}{I_E}$

16) What are main advantages of IC's over ordinary circuits?

**Answer :** The size, speed and capacity of chips have progressed enormously with the advancement in technology. Computers, mobile phones and other digital home appliances are now made possible by the small size and low cost of ICs, ICs can function as an amplifier, oscillators, timer, microprocessor and computer memory.

17) What is the use of repeaters in communication system?

**Answer :** Repeaters are used to increase the range or distance through which the signals are sent. It is a combination of transmitter and receiver. The signals are received, amplified and retransmitted with a carrier signal of different frequency to the destination. Example: The communication satellite in space.

18) What is the necessity of having modulation?

**Answer :** The energy of low frequency information signal is not sufficient to be sent directly to a long distance. Therefore low frequency base band signal is to be superimposed onto a high frequency radio signal by the process called modulation so that it can be transmitted to long distances with less attenuation.

19) What is amplitude modulation?

**Answer :** If amplitude of the carrier signal is modified in proportion to the instantaneous amplitude of the base band signal, then it is called amplitude modulation.

20) What is phase modulation?

**Answer :** The instantaneous amplitude of the base band signal modifies the phase of the carrier signal keeping the amplitude and frequency constant is called phase modulation.