Multiple Choice Questions

Choose the correct answer from the following choices:

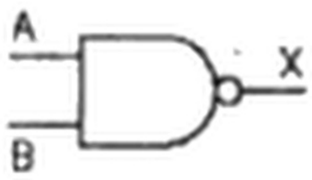
i) The process by which electrons are emitted by a hot metal surface is known as:

a) boiling b) evaporation c) conduction d) thermionic emission

ii) The particles emitted from a hot cathode surface are:

a) positive ions b) negative ions c) protons d) electrons

iii) The logical operation performed by this gate is:



a) AND b) NOR c) NAND d) OR

iv) AND gate can be formed by using two:

a) NOT gates b) OR gates c) NOR gates d) NAND gates

v) The output of a two—input NOR gate is 1 when:

a) A is 1 and B is 0
b) A is 0 and B is 1
c) both A and B are 0
d) Both A and B are 1

vi) "X = AB, then X is I when:

a) A and B are 1
b) A or B is 0
c) A is 0 and B is 1
d) A is 1 and B is 0

vii) The output of a NAND gate is 0 when:

a) both of its inputs are 0
b) both of its inputs are I
c) any of its inputs is 0
d) any of its inputs is I

Correct Answers

1. D	4. D	7. B
2. D	5. C	
3. C	6. A	

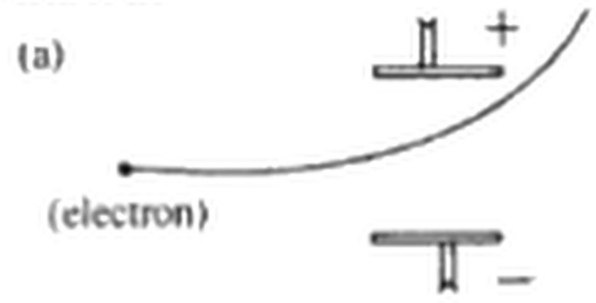
REVIEW QUESTIONS

16.1 Describe, using one simple diagram in each case, what happens when a narrow beam of electrons is passed through (a) a uniform electric field (b) a

uniform magnetic field. What do these results indicate about the charge on electron?

Answer

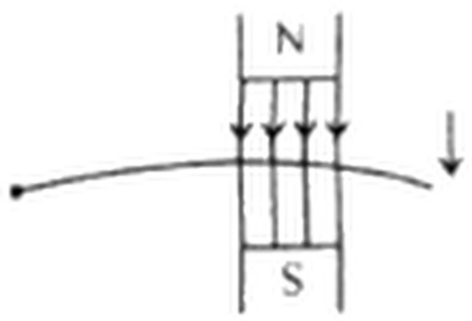
(a)



(Uniform electric field).

[Electron is attracted by the positive plate]

(b)



(uniform magnetic field).

[electron is deflected perpendicular to the direction

Of magnetic field by right hand rule.

16.2 Explain the working off different parts of oscilloscope.

Answer

Please see the topic

16.3 Name some uses of oscilloscope.

Answer

Uses of oscilloscope

I) it is used to study the waves form of the wave displayed on the screen.

2) CRO is used to measure the voltage and frequency of the wave.

3) The time period can also be determined with the help of CRO.

16.4 Considering an oscilloscope explain.

i) How the filament is heated?

ii) Why the filament is heated?

iii) Why the anode potential is positive with respect to the cathode potential?

iv) Why a large potential is applied between anode and cathode?

v) Why the tube is evacuated?

Answer

i) Filament in CRO is heated due to the resistance in tungsten wire, when the current is passed through it.

ii) The high resistance of filament wire (tungsten) cause to produce heat. That is why it starts glowing when current passes through it.

iii) Anode potential is kept positive to accelerate the electrons in the form of a beam with high speed.

iv) The purpose of large potential difference of anode is to accelerate the electrons towards the screen with a high speed. '

v) The tube is evacuated so that no ionization due to electrons could take place and the electrons could move freely towards the screen.

16.5 What is electron gun? Describe the process of thermionic emission.

Answer

Please see the topic.

16.6 What do you understand by digital and analogue quantities?

Answer

Please see the topic.

16.7 Differentiate between analogue electronics and digital electronics. Write down names of five analogue and five digital devices that are commonly used in everyday life.

Answer

a) Please see analogue and digital electronic in the topic.

b) **Analogue devices**

Thermometer, barometer, manual watches, loud speaker, amplifier etc..

Digital devices

Radar, telephone, naval system, computer, digital watches, digital filling station unit.

16.8 State and explain for each case whether the information given by the following devices is in analogue or a digital form.

a) a moving-coil voltmeter measuring the e.m.1' of a cell.

b) a microphone generating an electric current.

c) a central heating thermostat controlling the water pump.

d) automatic traffic lights controlling the flow of traffic.

Answer

a) A moving coil galvanometer measuring the e. m. f. ofa cell Is an analogue form because it measure the potential difference when it changes gradually. .

b) Microphone also gives the result when the intensity of sound Is gradually changed so it Is also an analogue form.

c) A central heating thermostat gives us only two states either high or low. At one of the states, thermostat works and at the other state it stops working so it is a digital from.

d) Automatic traffic lights give us two states only. It means that either the lights will be ON or OFF. So it is also a digital form.

16.9 Write down some benefits of using digital electronics over analogue electronics.

Answer

Quick output result small sized circuits, Auto system, visual study of waves etc. are the benefits of digital electronics.

16.10 What are the three universal Logic Gates? Give their symbols and truth tables.

Answer

Please see the topic.

Conceptual Questions

16.1 Name two factors which can enhance thermionic emission.

Answer

1) Passing more current through the filament wire.

2) Using such material in the filament wire which has more resistance.

16.2 Give three reasons to support the evidence that cathode rays are. negatively charged electrons.

Answer

a) By setting up an electric field perpendicular to the flow of calpode rays the deflection of electron towards the positive plate will indicate that cathode rays are negatively charged.

b) By setting up a magnetic field perpendicular to cathode rays. By right hand rule, the deflection of cathode rays will indicate that these have negative charge.

c) By placing a cathode cylinder in front of filament. The repulsion of cathode rays from the negatively charged cathode cylinder will show the negative charge on the cathode rays.

16.3 When electrons pass through two parallel plates having opposite charges, they are deflected towards the positively charged plate. What important characteristic of the electron can be inferred from this?

Answer

It infer that electrons are negatively charged particles.

16.4 When a moving electron enters the magnetic field, it is deflected from its straight path. Name two factors which can enhance electron deflection.

Answer

More strength of magnetic field and more speed of electrons may enhance deflection of electrons from the straight path.

16.5 In what ways is an oscilloscope a voltmeter?

Answer

We can measure the voltage from the wave displayed on the screen of CRO. A graph is calibrated on the screen. By measuring the amplitude of the wave graphically, we can calculate the voltage- '

16.6 How can you compare the logic operation X=A.B with usual operation of multiplication.

Answer

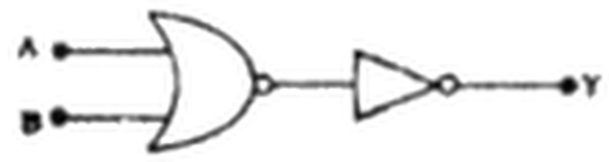
In the expression X = A.B, dot (.) stand for AND, means A and B while in usual form (.) means multiplication of two digits or factors.

16.7 NAND gate is the reciprocal of AND gate. Discuss

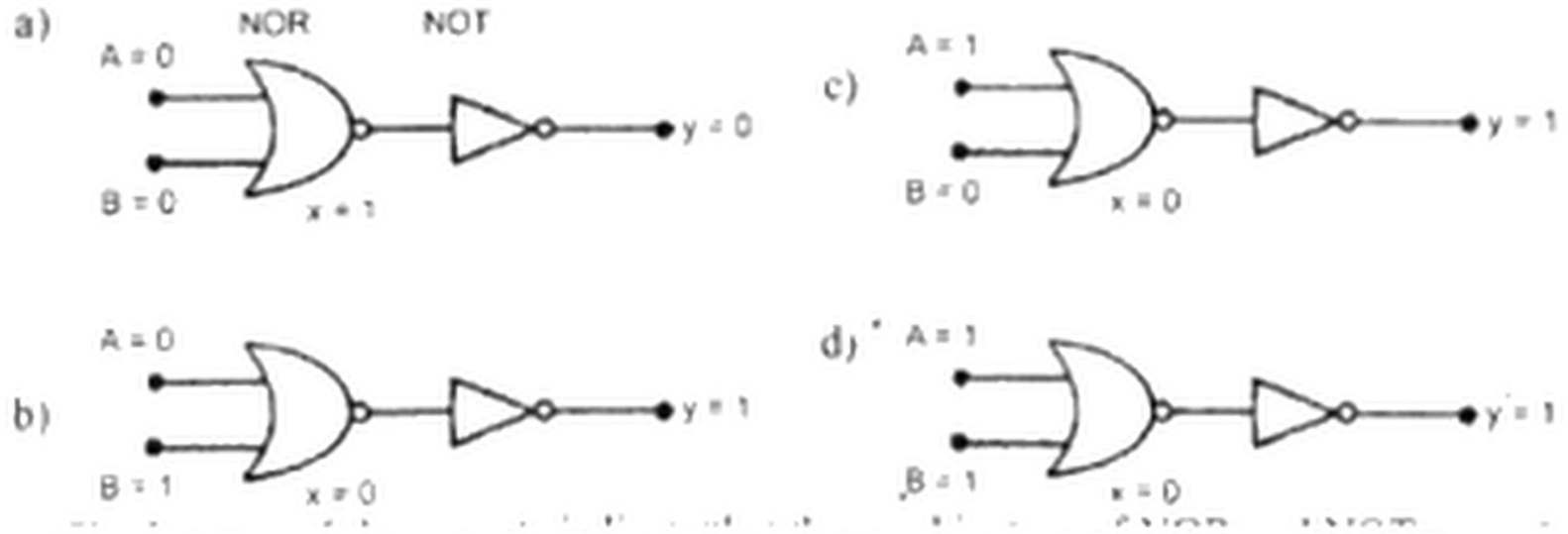
Answer

It is clear from the truth tables of NAND gate and AND gate that in AND gate output will be '1' when both inputs are also 'I' while in NAND gate when both inputs are '1' then the output is '0'. It shows that AND gate and NAND gate are reciprocal to each other.

16.8 Show that the circuit given as below acts as OR gate.



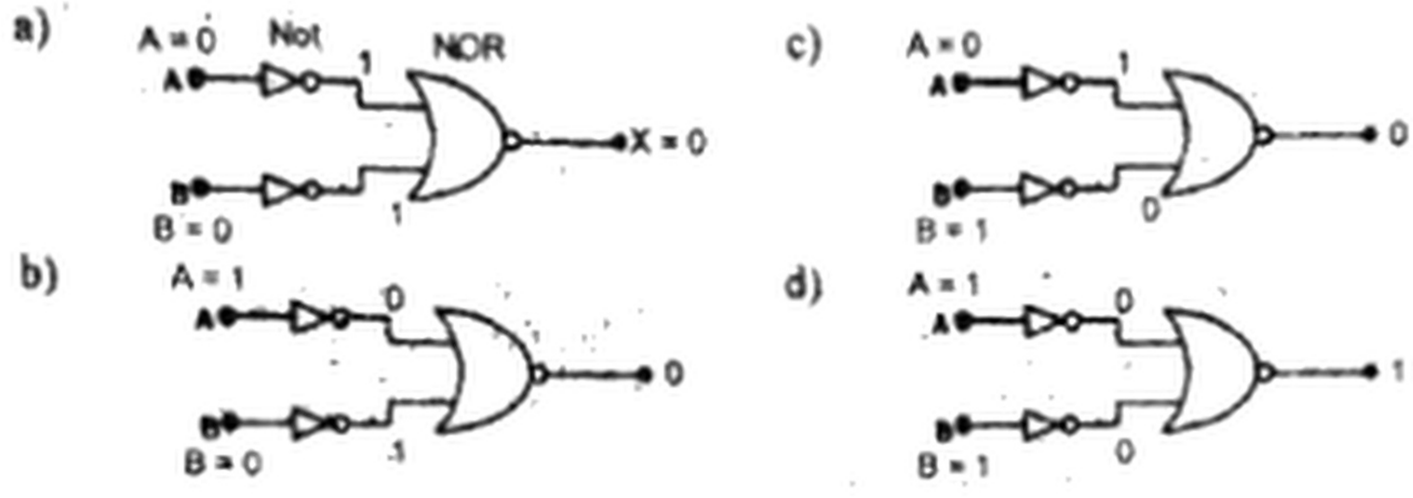
Answer



The inputs and the outputs indicate that t-he combination of NOR and NOT gate gives us the results Of OR gate.

16.9 Show that the circuit given as below acts as AND gate.

Answer



The inputs and the outputs indicate that the combination of NOT gate with NOR gate as shown above gives us the results of AND gate.