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Electrical Engineering Interview Questions

Q1. Explain what CMOS is and its benefits?

CMOS stands for **Complementary Metal Oxide Semiconductor**. Some of its benefits include less power consumption while increasing the noise immunity at the same time. Moreover, you may also expect low amounts of heat wastage.

Q2. Explain the difference between Verilog Task and Verilog Function?

Difference between Verilog Task and Verilog Function

Verilog Task

A task can contain time-controlling statements.

A task can enable functions as well as other tasks.

A task can be with or without an input argument

Verilog Function

A function shall execute in one simulation time unit.

A function is not able to enable a task.

A function must have at least one input as an argument.

Q3. Explain What Is Electric Traction? Explain few advantages of Electric Traction System?

Electrical Traction means the system that uses electrical power for traction system i.e. for railways, trams, trolleys, etc. is called electrical traction.

Main Advantages Electrical Traction System are :

- It is free from smoke and flu gases. So clean
- Regenerative braking is used
- D.C. series motors are used because of its high starting torque characteristics. So high acceleration.
- Economical operation cost.

Q4. What is phenomenon of Electromagnetic Induction and how it works?

Electromagnetic Induction is a process whereby the electromotive force is generated. This can be done in two ways. The first one goes by introducing a changing magnetic environment to a conductor whereas the second option deals with letting a conductor move in a field having a magnetic effect.

Q5. Explain the functioning of Diode?

The diodes are used where the energy is required to be flowed only in one direction.

Q6. What is Difference between MCB and MCCB.

MCB and MCCB both are both are circuit breakers but they are made for different jobs. Below are the few differences between MCB and MCCB

Difference Between MCB and MCCB

MCB

MCB stands for Miniature Circuit Breakers and generally used with home electrical applications. MCB is rated to withstand as high as 100 amps. It is used for overload and overheating protection of home appliances

MCCB

MCCB stand for Molded Case Circuit Breakers and have heavier-duty than MCBs used in companies and industries. MCCB is rated to withstand as high as 2,500 amperes. It is used for overload and fault protection for highly energy-intensive systems.

Q7. List few applications of D.C Series Motor?

Applications of D.C Series Motor are

- It is a variable speed motor i.e. very low speed at high torque and vice versa. However, at no load motor tends to occupy dangerous speed. The motor has a very high starting torque. So it is used for :
 - The series DC motor is an industry workhorse for both high and low power, fixed and variable speed electric drives.
 - Applications range from cheap toys to automotive applications.
 - They are inexpensive to manufacture and are used in variable speed household appliances such as sewing machines and power tools.
- Its high starting torque makes it particularly suitable for a wide range of traction applications.
- Industrial uses are hoists, cranes, trolley cars, conveyors, elevators, air compressors, vacuum cleaners, sewing machines etc.

Reference: <https://www.ukessays.com/essays/engineering/applications-of-dc-series-motors.php>

Q8. What is difference between Isolator and Circuit Breaker?

Difference between Isolator and Circuit Breaker

- An isolator is an off-load device while the circuit breaker is an on load device.

- An isolator is a switch operated manually, which separates the circuit from the power main and discharges the trapped charges in the circuit.
- Circuit breakers operate automatically, triggered by an electromechanical mechanism inside and are a safety feature for abnormal loads and voltages in the circuit.

Q9. Explain What is Clipper and Clamper circuits?

Clipper and Clamper circuits

Q10. List some examples of renewable energy?

Biogas, wind energy, thermal energy, solar energy are a few examples of renewable energy.

Q11. Explain Dc Generator with its types?

A dc generator is an electrical machine which converts mechanical energy into direct current electricity.

There are 2 types of D.C. Generators

- Separately excited d.c.generator.
- Self excited d.c.generator.

Q12. What is Relation between mu(nought) and epsilon(nought)?

The relation between mu(nought) and epsilon(nought)

Mu(nought) is known as the permeability of free space and it is used as the relation between changes and the magnetic field produced by the charges. While **epsilon(nought)** is known as the permittivity of free space and it is used for depicting the relation between static charges and electric field of charges. There is no basic relation between mu(nought) and epsilon(nought) both of them are used for different instances.

According to coulomb's law

$$E = (1/4\pi\epsilon_0) \times (q/r^2)$$

Here, **E** = Electric field, **ε₀** = Permittivity of free space, **Q** = charge

According to Biot-Savart law

$$B = (\mu_0/4\pi) \times Idl (\sin\theta)/r^2$$

Here, **B** = Magnetic field, **μ₀** = Permeability of free space, **I** = current

Q13. Which motors are used in electric traction?

It all depends on which Locomotive trains you regard.

WAP-4, WAP-1, WAg-5/6/7, WAM-4, and WCAM-1/2/3 all utilize DC series motor as the traction motors on mainline locomotives. These locos are believed to constitute more than 70% of a large piece of IR's locos.

Three phase induction are utilized as Traction motors by WAP-5/7 and WAG-9.

In the local areas, DC locals use DC type of motor while three-phase induction motors are used by the newer BHEL and Siemens.

In the diesel locos, three-phase induction motors are used by the EMD's such as WDP-4/4B/4D and WDG-4/4D whereas the alcos locomotives such as WDM-2/3A/3D/3F, WDG-3A WDP-1/3A uses the DC traction motors

Q14. What is reactive power?

Reactive power is the power that flows back from a destination toward the grid in an alternating current scenario in electrical grid systems. The unit of reactive power is kilo volt-ampere reactive (kVAR) or MVAR. The voltage and load are static, and to put it simply, the direction of energy is "one way," but in alternating current, there are different phases having to do with elements of the system like capacitors and inductors in a direct current system.

Q15. Why an AC systems are preferred over DC systems?

The reasons for preferring the AC system over DC are as follows: It is easy to maintain and changes the voltage of AC power for transmission and distribution. AC voltages can be easily transformed to higher or lower voltage levels, while it is difficult to do in the case of DC voltages. The maintenance cost for AC transmission is lower than the DC transmission. In the DC System, the speed control range is greater than the AC System. There is low insulation needed in the DC system (about 70%).

Q16. What do you understand by AVR?

AVR stands for Automatic Voltage Regulator.

Q17. Explain the fundamental difference between EMF (Electro Motive force) and PD (Potential Difference) ?

Q18. What is slip in an Induction motor?

In Induction Motor, Slip is the relative speed between the rotating magnetic flux and rotor expressed in terms of per unit synchronous speed. It is a dimensionless quantity.

Q19. How NPN and PNP transistor works

Working of NPN transistor

Reverse biased in the transistor is connected over the collector-base junction while forward biased is connected over the emitter-base junction. In this type of transistor VCB i.e. reverse biased voltage is more than forward biased voltage.

The emitter is highly doped in the NPN transistor. A bulk of the charge carrier draws near the base when the forward biased is connected over the emitter. Due to this, the emitter current referred as I_E is generated. After that, the electron access into P-type and join with the holes.

On the other hand, the base of the NPN transistor is less doped. As a result of this, only a small number of electrons are able to combine and the rest of these forms base current I_B . After that, the base current I_B access into the collector region. A very high attractive force on the electrons moving toward collector junction is applied by the reversed bias potential of the collector region. This makes an accumulation of the electrons on the collector region.

The entire current of the emitter is access into the base. We will be able to say that the total of the collector or the base current forms emitter current.

Working of PNP transistor

Forward Biased is applied across the emitter-base junction. As a result, the emitter forces the holes in the base region. It forms the emitter current.

These holes draw into the N-type semiconductor and join with the electrons. Due to the thin base of the transistor and lightly doped only a number of holes are able to combine with the electrons and the rest of the holes draws into the collector space charge layer. And this forms the base current.

The reverse base region is applied across the collector base region. The holes which are accumulated throughout the depletion region are collected by the collector under the force of negative polarity. This forms the collector current.

Q20. What Is Sf6 Circuit Breaker?

An SF6 circuit breaker is a type of circuit breaker. Sulfur hexafluoride gas or SF 6 gas is used as the arc quenching medium, known as an SF6 circuit breaker. SF 6 gas has an excellent insulating property. It has an electro-negative gas and also has a strong tendency to absorb free electrons.

Q21. What is KVAR?

KVAR stands for Kilo Volt Ampere Reactive which is used to produce the magnetizing flux by Magnetic equipment (transformer, motor, relay, etc.). It is Reactive Power. It is also the ratio between active power and apparent power.

Q22. What is a diode?

A diode is a two-terminal electronic component. It also conducts current primarily in one direction (asymmetric conductance) but has low (ideally zero) resistance in one direction, and high (ideally infinite) resistance in the other.

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