

Winmeen Tnpsc Group 1 & 2 Study Materials

Tnpsc Group 2 Complete Syllabus : <https://goo.gl/fNSnMN>

Tnpsc Group 2 Previous Questions : <https://goo.gl/PYqsd7>

Tnpsc Group 2 Model Questions : <https://goo.gl/xQvyTk>

16. Electricity and Energy

1. What is electric circuit?

A continuous and closed path of an electric current is called an electric circuit.

2. What is electric current?

Electric current is expressed by the amount of charge flowing through a particular area of cross section of a conductor in unit time.

3. What is coulomb?

The SI unit of electric charge is coulomb.

4. What is Ampere?

The electric current is expressed by a unit called ampere (A), named after the French Scientist Andre - Marie Ampere.

5. What is one ampere?

When one coulomb of charge flows in one second across any cross section of a conductor, the current in it is one ampere.

6. What is electrical potential difference?

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The electric potential difference between two points in an electric circuit is the work done in moving a unit positive charge from one point to the other.

Potential difference (V) = work done / charge

7. What is voltmeter?

The potential difference is measured by an instrument called voltmeter.

8. What is Ohm's law?

Ohm's law states that at constant temperature the steady current (I) flowing through a conductor is directly proportional to the potential difference (V) between its ends.

$I \propto V$ (or) $V/I = \text{Constant}$

9. How can we connect resistors?

Resistors can be connected in (a) series (b) parallel.

10. What is heating effect of electric current?

The rest of the energy may be expended in heat to raise the temperature of the gadget. If the electric circuit is purely resistive, the energy of the source

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continuously gets dissipated entirely in the form of heat. This is known as heating effect of electric current.

11. What is Joule's law?

Thus for a steady current I , the amount of heat H produced in time t is

$$H = W = VQ$$

since, $Q = It$

Applying Ohm's law we get $H = I^2 Rt$.

This is known as Joule's law of heating.

The law implies that heat produced in a resistor is (1) Directly proportional to the square of current (I^2) for a given resistance, (2) directly proportional to the resistance (R) for a given current, (3) directly proportional to the time(t) for which the current flows through the resistor.

12. What is role fuse?

A common application of Joule's heating is the fuse used in electric circuits. It consists of a piece of wire made up of an alloy (37% Lead, 63% Tin).

13. Name the colour of wires and their use?

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- One of the wires in the supply, usually with red insulation, is called live wire.
- Another wire, with black insulation, is called neutral wire. In our country, the potential difference between the two are 220 V.
- Another wire in green insulation is called earth wire.

14. What is electric power?

The rate of consumption of electric energy is termed as electric power. The power P is given by $P = VI$ (or) $P = I^2R$ = The SI unit of electric power is watt (W). 1 watt is the power consumed by a device that carries 1 A of current when operated at a potential difference of 1 V. Thus, $1 \text{ W} = 1 \text{ volt} \times 1 \text{ ampere} = 1 \text{ V A}$

15. What is commercial use of electric energy?

One watt hour is the energy consumed when one watt of power is used for one hour. The commercial unit of electric energy is kilowatt hour (KWh), commonly known as unit.

16. What is electrolysis?

When the current is passed through aqueous or molten solutions of inorganic acids, bases and salts, the conduction of electricity is always accompanied by chemical decomposition of the solutions. Such solutions are called electrolytes and the

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phenomenon of the conduction of electricity through electrolytes by chemical decomposition is called electrolysis.

17. What is electrochemical cells?

The cells in which the electrical energy is derived from the chemical action are called electrochemical cells.

18. What is primary cell?

The cells from which the electric energy is derived by irreversible chemical reaction are called primary cells. The primary cell is capable of giving an electromotive force(emf), when its constituents, two electrodes and a suitable electrolyte, are assembled together. The main primary cells are Daniel cell and Leclanche cell. These cells cannot be recharged.

19. What is leclanche cell?

A Leclanche cell consists of a glass vessel which is filled with ammonium chloride solution. Ammonium chloride solution acts as an electrolyte.

20. What is lead acid accumulators?

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A lead-acid accumulator, the anode and cathode are made of lead dioxide and lead respectively. The electrolyte is dilute sulphuric acid. As power is discharged from the accumulator, both the anode and cathode undergoes a chemical reaction that progressively changes them into lead sulphate. When the anode and cathode are

connected by a wire, the current flows from anode to cathode through the wire.

21. What is secondary cells?

The advantage of secondary cells is that they are rechargeable. The chemical reactions that take place in secondary cells are reversible.

22. What is accumulator?

When current is applied to a lead-acid accumulator, the electrochemical reaction is reversed. This is known as recharging of the accumulator.

23. What re good source of energy?

A good source of energy would be one

- Which would do a large amount of work per unit volume of mass

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- Be easily accessible
- Be easy to store and transport
- Most importantly be economical.

24. What is the use of thermal power plant?

The term thermal power plant is used since fuel is burnt to produce heat energy which is converted into electrical energy.

25. What is hydro power plant?

Hydro power plants convert the potential energy of falling water into electricity. Since

there are very few waterfalls which could be used as a source of potential energy, hydro

power plants are associated with dams.

26. What is biomass?

Given the large amount of live stock in India, this can also assure us a steady source of fuel. Since these fuels are plant and animal products, the source of these fuels is said

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to be biomass.

27. What is solar energy?

The sun has been radiating an enormous amount of energy at the present rate for nearly 5 billion years and will continue radiating at that rate for about 5 billion years more. Only a small part of solar energy reaches the outer layer of the earth's atmosphere. Nearly half of it is absorbed while passing through the atmosphere and the rest reaches the earth's surface.

28. What is wind energy?

The kinetic energy of the wind can be used to do work. This energy was harnessed by windmills in the past to do mechanical work. For example, in a water-lifting pump, the rotatory motion of windmill is utilized to lift water from a well. Today, wind energy is also used to generate electricity.

29. What is radio-active elements?

The phenomenon of spontaneous emission of highly penetrating radiations such as α , β , and γ rays by heavy elements having atomic number greater than 82 is called radioactivity and the substances which emit these radiations are called radioactive elements.

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30. What is nuclear fission?

The process of breaking up of the nucleus of a heavier atom into two fragments with the release of large amount of energy is called nuclear fission.

31. What is nuclear fusion?

Nuclear fusion is a process in which two or more lighter nuclei combine to form a heavier nucleus

32. What is thermo nuclear reaction?

The fusion process can be carried out only at extremely high temperature of the order of 10^7 K because, only at these very high temperatures the nuclei are able to overcome their mutual repulsion. Therefore before fusion, the lighter nuclei must have their temperature raised by several million degrees. The nuclear fusion reactions are known as thermo nuclear reactions.

33. What is the fusion reaction in nuclear bomb?

The fusion reaction in the hydrogen bomb is $1\text{H}2 + 1\text{H}3 \rightarrow 2\text{He}4 + 0\text{n}1 + \text{Energy}$.

34. What is the advantage of nuclear reactivity?

- Nuclear reactivity is a measure of the state of a reactor regarding criticality.

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- It is a useful concept to predict how the neutron population of a reactor will change over time.
- If a reactor is critical, that is, the neutron production is exactly equal to the neutron destruction, then the reactivity is zero.
- If the reactor is super critical (neutron production > neutron destruction) then the reactivity is positive i.e, unsafe. If the reactor is sub critical (neutron production < neutron destruction) then the reactivity is negative i.e, safe.

35. What is radiation exposure measured?

The radiation exposure is measured by the unit called roentgen(R). One roentgen is defined as the quantity of radiation which produces 1.6×10^{12} pairs of ion in 1 gram of air.

36. What is high and low tide?

Due to the gravitational pull of the moon on the earth, the level of the water in the sea rises and falls. If you live near the sea or ever travel to some place near the sea, try and observe how the sea-level changes during the day. The phenomenon is called high and low tides and the difference in sea levels gives us tidal energy.

37. What is wave energy?

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The kinetic energy possessed by huge waves near the sea-shore can be trapped in a similar manner to generate electricity. The waves are generated by strong winds blowing across the sea. Wave energy would be a viable proposition only where waves are very strong.

