

1. The property of material which enables it to be drawn into sheets and plates is known as?

- (1) Ductility (2) Plasticity
(3) Malleability (4) Toughness.

Ans (3)

2. The ratio of the R.M.S. value to the average value of A.C. current/voltage is called

- (1) Peak factor (2) Load factor (3) Form factor (4) Power factor.

Ans (3)

Peak Factor is defined as the ratio of maximum value to the R.M.S value of an alternating quantity

Load factor is defined as the ratio of the average load over a given period to the maximum demand (peak load) occurring in that period.

Power factor (PF) is the ratio of working power, measured in kilowatt (kW), to apparent power, measured in kilovolt ampere (kVA)

3. Fleming's Right hand Rule can be used in finding the direction of induced e.m.f. in

- (1) Generator (2) Motor (3) Transformer (4) Alternator

Ans (1)

Note: Fleming's right-hand rule (for generators) shows the direction of induced current when a conductor attached to a circuit moves in a magnetic field. It can be used to determine the direction of current in a generator's windings.

4. Unit of measuring inductance is

- (1) Ohms (2) Coulombs (3) Weber (4) Henry

Ans (4)

5. What is the colour coating of oxygen containing cylinder?

- (1) Black (2) White (3) Maroon (4) Blue.

Ans (1)

6. What is the colour coating of acetylene containing cylinder?

- (1) Black (2) White (3) Maroon (4) Blue.

Ans (3)

7. What is the colour coating of Argon containing cylinder?

- (1) Black (2) White (3) Peacock blue (4) Blue.

Ans (3)

8. Zener diode is used as

- (1) Voltage regulator (2) Rectifier (3) Amplifier (4) Capacitor.

Ans (1)

Note: A voltage regulator generates a fixed output voltage of a preset magnitude that remains constant regardless of changes to its input voltage or load conditions. There are two types of voltage regulators: linear and switching.

A linear regulator employs an active (BJT or MOSFET) pass device (series or shunt) controlled by a high gain differential amplifier. It compares the output voltage with a precise reference voltage and adjusts the pass device to maintain a constant output voltage.

A switching regulator converts the dc input voltage to a switched voltage applied to a power MOSFET or BJT switch. The filtered power switch output voltage is fed back to a circuit that controls the power switch on and off times so that the output voltage remains constant regardless of input voltage or load current changes.

<https://www.analog.com/en/technical-articles/how-voltage-regulator-works.html#>

9. What is the colour coating of hydrogen containing cylinder?

- (1) Black (2) White (3) Signal red (4) Blue.

Ans (3)

10. Major alloying elements in stainless steel is

- (1) Chromium-Tungsten (2) Chromium-Nickel.
(3) Vanadium-Nickel (4) Tungsten-Nickel.

Ans (2)

11. An electrical generator converts
- (1) Mechanical energy into light energy.
 - (2) Electrical energy into mechanical energy.
 - (3) Mechanical energy into electrical energy
 - (4) None of these.

Ans (3)

Note: In electricity generation, a **generator** is a device that converts mechanical energy (motive power) into electrical power for use in an external circuit. Sources of mechanical energy include steam turbines, gas turbines, water turbines, internal combustion engines, wind turbines, etc. The first electromagnetic generator, the Faraday disk, was invented in 1831 by British scientist Michael Faraday. Generators provide nearly all of the power for national electric power grids.

The reverse conversion of electrical energy into mechanical energy is done by an electric motor, and motors and generators have many similarities. Many motors can be mechanically driven to generate electricity.

https://en.wikipedia.org/wiki/Electric_generator

12. Suction in a diesel engine consists of
- (1) Fuel only
 - (2) Mixture of air and fuel
 - (3) Air only
 - (4) None of these.

Ans (3)

13. Sound waves cannot travel through
- (1) Iron
 - (2) Hydrogen
 - (3) Oil
 - (4) Vacuum.

Ans (4)

14. In the human body most of the digestion takes place in the
- (1) Stomach
 - (2) Pancreas
 - (3) Small intestine
 - (4) Large intestine.

Ans (3)

15. Which of the following cannot convert AC to DC?
- (1) Diode
 - (2) Mercury arc rectifier
 - (3) Converter
 - (4) Transformer

Ans (4)

16. The unit of magnetic flux is

- (1) Weber (2) Henry (3) Coulomb (4) Tesla

Ans (4)

Tesla is the unit of **magnetic flux** density, i.e., the SI derived **unit of magnetic flux** density is the tesla, which is defined as a volt second per square meter.

Magnetic flux is defined as the number of **magnetic** field lines passing through a given closed surface. It provides the measurement of the total **magnetic** field that passes through a given surface area.

Properties of magnetic flux

1. They always form a closed loop.
2. They always start from the north pole and ends in the south pole.
3. They never intersect each other.

Magnetic lines of forces that are parallel to each other and are in the same direction repel each other.

<https://circuitglobe.com/what-is-magnetic-flux.html>

17. Tachometer is used to measure

- (1) the rotational speed (rpm) of a shaft or disk (2) Volt
(3) Current (4) Velocity.

Ans (1)

18. Pascal is a unit of

- (1) Temperature (2) Power (3) Pressure (4) Energy.

Ans (3)

19. Electrical energy is measured in the term of

- (1) Watt (2) Volt (3) Ampere (4) Kilowatt-hour.

Ans (4)

20. In diesel engine, the fuel is ignited by

- (1) a glow plug
(2) a spark plug
(3) an injector
(4) by virtue of appropriate temperature rise of air at the end of compression stroke

Ans (4)

21. The voltage applied across the lamp of a 3 cell (dry cell) torch will be

- (1) 1.5 V (2) 3 V (3) 4.5 V (4) 6 V.

Ans (3)

Note: A common dry cell is the zinc-carbon cell, sometimes called the dry Leclanché cell, with a nominal voltage of **1.5 volts**, the same as the alkaline cell (since both use the same zinc–manganese dioxide combination)

22.. is used to convert AC to DC

- (1) **rectifier** (2) inverter (3) transistor (4) none of these

Ans (1)

Note:Rectifier is used to convert AC to DC while **Inverter** is used to convert DC to AC. (An inverter **converts** the **DC** electricity from sources such as batteries or fuel cells to **AC** electricity.)

23. Commutator segments in a D.C. machine are separated by thin layers of

- (1) Synthetic rubber (2) Paper (3) PVC (4) **MICA**

Ans (4)

WHAT IS COMMUTATOR?

It is also called a split-ring commutator. The split rings are made of phosphorous bronze and it is a device connected with the armature core. It is used to collect the current from the armature winding. It changes the form of AC to DC or DC to AC depending upon the requirement. The figure that depicts the cross-sectional view is shown below.

It consists of some segments which are arranged in series to which the ends of armature winding are connected. These divided segments are termed as the commutator segments. These segments are laminated by a thin layer of Mica with a thickness of 0.6 to 0.8mm. The dielectric strength of these segments is nearly 30V to 40V. The segments are made of hard drawn copper of high conductivity. Each segment consists of two coil sides (as one coil contains two coil sides).

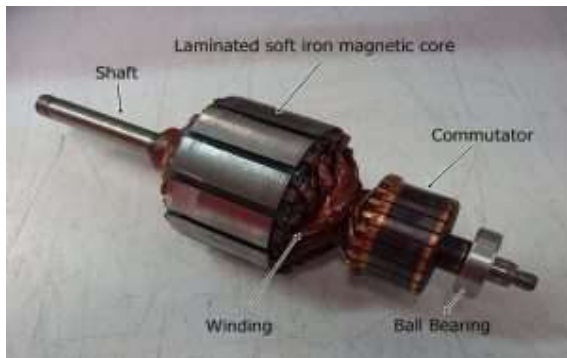
The number of these segments is equal to the number of coils.

It is attached to the brush which is used to collect the current from the segments. The segments are the rotating part whereas the brushes are the stationary part.

The output of any machine is AC or alternating current whether it is direct current (DC) or AC generator. Thus, in DC generator a device is necessary to change the current from alternating to direct. This necessity can be fulfilled by using a commutator.

THE FUNCTION OF THE COMMUTATOR SEGMENT

It is a device that converts either AC to DC or DC to AC, i.e., it can act as both “Rectifier” or as an “Inverter” depending upon the requirement.



<https://www.watelectrical.com/commutator-working-applications/>

24. is used to convert D.C. to A.C.

- (1) rectifier (2) inverter (3) transistor (4) none of these

Ans (2).

WHAT IS AN INVERTER?

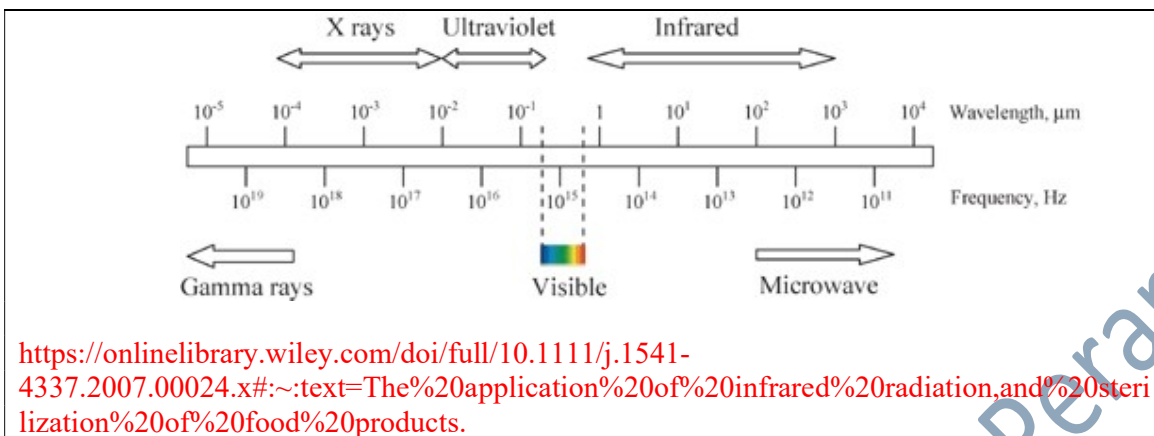
An inverter (or power inverter) is a power electronics device which used to convert DC voltage into AC voltage. The inverter takes DC power from the batteries and converts into AC power at the time of the power failure. A power inverter used in the power system network to convert bulk DC power to AC power. It is used at the receiving end of HVDC transmission lines. This inverter is known as a **grid-tie inverter**.

25. Which of the following EM rays are used for heating applications

- (1) infra red rays (2) ultra violet rays (3) cathode rays (4) none of these.

Ans (1)

Note: The **application** of **infrared** radiation to food processing has gained momentum due to its inherent advantages over the conventional **heating** systems. **Infrared heating** has been applied in drying, baking, roasting, blanching, pasteurization, and sterilization of food products



26. When two cells, each of 12 V, are connected in parallel, the voltage across them is
- (1) 12 V (2) 24 V (3) Zero (4) none of these

Ans (1)

27. The unit Parsec is a measure of
- (1) Distance between planets (2) Distance between sun and earth
 (3) Brightness of light (4) None of the above.

Ans (2)

Note: **Parsec**, unit for expressing distances to stars and galaxies, used by professional astronomers. It represents the distance at which the radius of Earth's orbit subtends an angle of one second of arc. Thus, a star at a distance of one parsec would have a parallax of one second, and the distance of an object in parsecs is the reciprocal of its parallax in seconds of arc. It approximately equals to 3.26 light-years or 206,000 astronomical units, i.e., 30.9 trillion kilometres.

28. The property of material which enables it to be drawn into wires is called?
- (1) Ductility (2) Plasticity (3) Malleability (4) Toughness.

Ans (1)

29. Due to rusting, the mass of a ferrous object
- (1) Remains the same (2) increases (3) decreases (4) None.

Ans (2)

Note: The **mass of iron** increases as **rusting** happens when oxygen combines with iron therefore the **mass** increases. when iron is **rusted**, it's **weight** increases, viz., Iron(Fe) is oxidised to Fe_2O_3 , i.e., **ferric** oxide, which is generally known as **rust**.

30. The presence of sulphur in a hydrocarbon fuels like petro, diesel and coal releases ... gas during combustion

- (1) SO_x (2)NO_x (3) CO₂ (4) None

Ans (1)

31. Which is the hardest natural material?

- (1) Diamond (2). Iron (3) Graphite (4) Steel

Ans (1)

32. Which is the softest material in Mho's hardness scale?

- (1) Diamond (2). Iron (3) Graphite (4)Talc

Ans (4)

Note: Reason for Talcum powder using as face powder.
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33. Quicksilver is a popular name for

- (1) Silver (2) Mercury (3) Stainless Steel (4) Platinum

Ans (2)

34. A 'lead' pencil is a misnomer because it actually contains

- (1) Coal tar (2) carbon (3) graphite (4) clay

Ans (3)

35. The ability of an organism to replace its structure or organs is called

- (1) Replacement (2) regeneration
(3) Rejuvenation (4) replenishment

Ans (2)

36 A Hydrometer is used to measure:

- (1) Relative Humidity (2) Viscosity
(3) Buoyancy (4) Specific Gravity of Liquid

Ans (4)

37. Process of aluminium oxide coating on aluminum object is

- (1) Oxidizing (2) Anodizing
 (3) Galvanizing (4) None of these

Ans (2)

38. Bagasse is

- (1) Type of coal (2) Type of wood fuel
 (3) Rice straw (4) Fiber portion of sugarcane after extracting the juice

Ans (4)

39. Heat flows through solids only by

- (1) Conduction (2) convection
 (1) Radiation (4) a combination of these

Ans (1)

40. Air resistance of car at 20 KMPH speed is R. The air resistance at 40 KMPH will be:

- (1) R (2) 2R (3) R² (4) 4R

Ans (4)

Note: $R \propto V^2$. $V \rightarrow 2V \therefore R \rightarrow 4R$

41. The unit of kinematic viscosity is

- (1) m kg/sec (2) kg sec/m²
 (3) m²/s (4) none of these

Ans (3)

Note: Kinematic viscosity is the ratio of the viscous force to the inertial force or fluid density ρ :

Kinematic viscosity has SI units of m² s⁻¹. The physical unit for kinematic viscosity is the *stokes* (St). It is sometimes expressed in terms of *centistokes* (cS or cSt); 1 stokes = 100 centistokes = 1 cm² s⁻¹ = 0.0001 m² s⁻¹.

42. A Barometer is used to measure:

- (1) Pressure in a pipe line (2) Very low pressures

- (3) Atmospheric pressure (4) none of these

Ans (3)

43. A ball is thrown vertically upwards with a velocity of 980 cm/s. The time for the ball to come back to earth will be:

- (1) 20 sec (2) 10 sec (3) 40 sec (4) 50 sec

Ans (1)

44. For a simple pendulum the time period of one oscillation, T is given by:

- (1) $2\pi\sqrt{\frac{g}{l}}$ (2) $2\pi\sqrt{\frac{2l}{g}}$
 (3) $2\pi\sqrt{\frac{l}{2g}}$ (4) $2\pi\sqrt{\frac{l}{g}}$

Ans (4)

45. For a simple pendulum the frequency of oscillation, f is given by:

- (1) $\frac{1}{2\pi}\sqrt{\frac{g}{l}}$ (2) $\frac{1}{2\pi}\sqrt{\frac{2l}{g}}$
 (3) $\frac{1}{2\pi}\sqrt{\frac{l}{2g}}$ (4) $\frac{1}{2\pi}\sqrt{\frac{l}{g}}$

Ans (1)

46. In isothermal expansion of gases

- (1) Temperature is lowered (2) Temperature increases
 (3) Temperature is unaltered (4) Temperature drops to zero

Ans (1)

47. In a 4 stroke Diesel engine, RPM of the crank shaft is 1000 RPM, the cam shaft RPM is

- (a) 1000 (b) 500 (c) 1500 (d) 2000

Ans: (b)

48. Choose the wrong statement

- | | | |
|-------------------------------------|---|------------------|
| 1. Lapping | - | Valve seat |
| 2. Connecting rod small end bearing | - | Needle bearing |
| 3. Valve levers | - | Tappet clearance |
| 4. Cylinders | - | Honing |

Ans: (b)

Note: Connecting rod bearing use - Shell bearing

49. Firing order of a 4 cylinder - 4 stroke engine is

- (a) 1,3,4,2 (b) 1,2,4,3 (c) 1,2,3,4 (d) 1,3,2,4

Ans: (a)

Note: Most **4-cylinder engines** have a **firing order** of 1-3-4-2 although other **firing orders** such as 1-3-2-4, 1-4-3-2 or 1-2-4-3 is possible.

50. The functions of flywheel and governor are respectively(**answer option not given**)

- (a) To increase power, to reduce speed
 (b) To balance the engine, to save fuel.
 (c) To even out the power output, to maintain constant speed at a particular load.
 (d) To decrease the power, to increases the speed.

Ans: (c)

Note: Governor is a device that automatically maintains the rotary speed of an engine or other prime mover within reasonably close limits regardless of the load. A typical governor regulates an engine's speed by varying the rate at which fuel is furnished to it. Nearly all governors depend for their action on centrifugal force and consist of a pair of masses rotating about a spindle driven by the prime mover and kept from flying outward by a controlling force, usually applied by springs. With an increase in speed, the controlling force is overcome and the masses move outward; the movement of the masses is transmitted to valves supplying the prime mover with its working fluid or fuel. The revolving masses are balls attached to a vertical spindle by link arms, and the controlling force consists of the weight of the balls. If the load on the engine decreases, the speed will increase, the balls *M* will move out, and the member *C* will slide up the vertical spindle and reduce the steam admitted to the engine, thus reducing the speed. An increase in the load will have the opposite effect. Modern governors are used to regulate the flow of gasoline to internal-combustion engines and the flow of steam, water, or gas to various types of turbines.

<https://www.britannica.com/technology/governor-machine-component>

<https://www.britannica.com/technology/flywheel>

Flywheel: Flywheel is an internal energy storage device. It absorbs mechanical energy during the period when the supply of energy is more than the requirement and releases it during the period when the requirement of energy is more than the supply. The main function of a fly wheel is to smoothen out variations in the speed of a shaft caused by torque fluctuations.

In automobile engines the flywheel serves to smooth out the pulses of energy provided by the combustion in the cylinders and to provide energy for the compression stroke of the pistons.

The energy stored in a flywheel, however, depends on both the weight distribution and the rotary speed; if the speed is doubled, the kinetic energy is quadrupled. A rim-type flywheel will burst at a much lower rotary speed than a disk-type wheel of the same weight and diameter. For minimum weight and high energy-storing capacity, a flywheel may be made of high-strength steel and designed as a tapered disk, thick at the centre and thin at the rim (see Figure B).



(A) rim-type flywheel; (B) tapered-disk flywheel
Encyclopaedia Britannica, Inc.

In power presses the actual punching, shearing, and forming are done in only a fraction of the operating cycle. During the longer, nonactive period, the speed of the flywheel is built up slowly by a comparatively low-powered motor. When the press is operating, most of the required energy is provided by the flywheel.

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