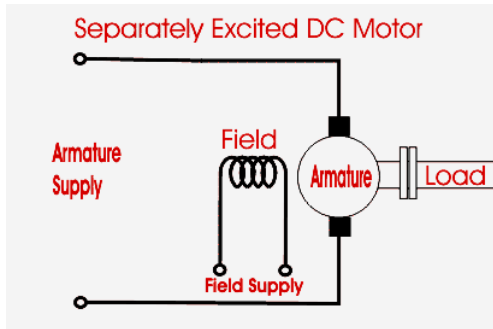


UNIT-2 ELECTRICAL MACHINES

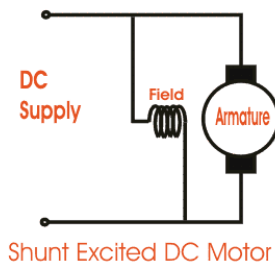
PART-A:

1. Draw the circuit for various types of d.c motor. (N/D-2016)

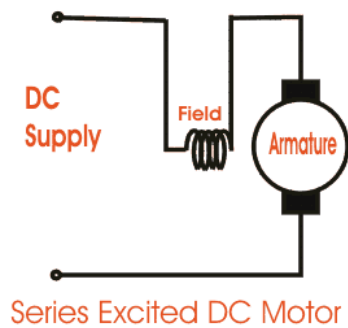
Separately Excited DC Motor



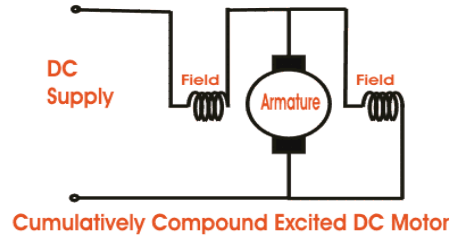
DC Shunt Motor



DC Series Motor



DC Compound Motor



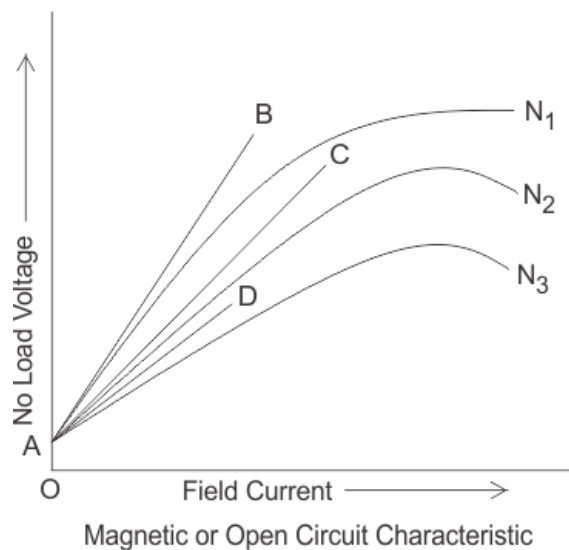
2. Define voltage regulation of transformer. (N/D-2016, M/J-2016)

The voltage regulation of the transformer is the percentage change in the output voltage from no-load to full-load.

3. Sketch the O.C.C of dc shunt generator. (M/J-2016)

Critical Load Resistance of Shunt Wound DC Generator

This is the minimum external load resistance which is required to excite the shunt wound generator



4. Write down the EMF equation of a transformer. (M/J-2016)

$$E_1 = 4.44 \cdot N_1 \cdot f \cdot B_m \cdot A \text{ and } E_2 = 4.44 \cdot N_2 \cdot f \cdot B_m \cdot A$$

5. List out the types of induction motor. (N/D-2015)

Induction motor types:

- Polyphase cage rotor.
- Polyphase wound rotor.
- Two-phase servo motor.
- Single-phase induction motor.
- Polyphase synchronous motor.

- Single-phase synchronous motor.
- Hysteresis synchronous motor.

6. Give some application of D.C motor. (A/M-2015,N/D-2016)

Shunt : driving constant speed, lathes, centrifugal pumps, machine tools, blowers and fans, reciprocating pumps

Series : electric locomotives, rapid transit systems, trolley cars, cranes and hoists, conveyors

Compound : elevators, air compressors, rolling mills, heavy planners

7. Why a single phase induction motor does not self -start? (A/M-2015, A/M-2017,N/D-2016)

When a single phase supply is fed to the single phase induction motor. Its stator winding produces a flux which only alternates along one space axis. It is not a synchronously revolving field, as in the case of a 2 or 3phase stator winding, fed from 2 or 3 phase supply.

8. Mention the application of DC generator? (A/M-2017)

- general lighting.
- Used to charge battery because they can be made to give constant output voltage.
- They are used for giving the excitation to the alternators.
- used for small power supply.

9. What is the significance of back EMF? (A/M-2017)

- When the motor is running on no load, small torque is required to overcome the friction and windage losses. Therefore, the armature current I_a is small and the back emf is nearly equal to the applied voltage.
- If the motor is suddenly loaded, the first effect is to cause the armature to slow down. Therefore, the speed at which the armature conductors move through the field is reduced and hence the back emf E_b falls. The decreased back emf allows a larger current to flow through the armature and larger current means increased driving torque. Thus, the driving torque increases as the motor slows down. The motor will stop slowing down when the armature current is just sufficient to produce the increased torque required by the load.
- If the load on the motor is decreased, the driving torque is momentarily in excess of the requirement so that armature is accelerated. As the armature speed increases, the back emf E_b also increases and causes the armature current I_a to decrease. The motor will stop accelerating when the armature current is just sufficient to produce the reduced torque required by the load.

10. Write the principle of DC Motor?(N/D-2015)

Fleming's left hand rule to determine the direction of force acting on the armature conductors of DC motor. If a current carrying conductor is placed in a magnetic field perpendicularly, then the conductor experiences a force in the direction mutually perpendicular to both the direction of field and the current carrying conductor. Fleming's left hand rule says that if