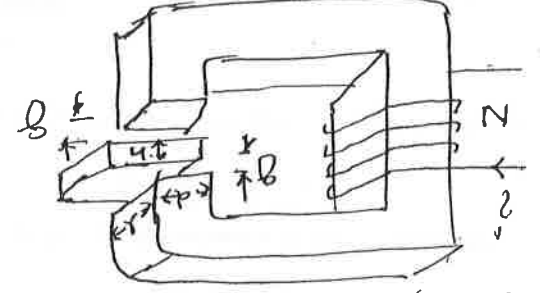


- (6) Q.1 a) Choose correct alternative from given options
- i) Which of the following test must be performed on a transformer to determine its leakage reactance
- ii) The armature current & speed of dc separately excited motor will be a) both oc & sc b) oc only c) sc only d) voltage ratio respectively by halving armature voltage & field current with load torque remaining constant then
- a) I_a remains same, W_m becomes twice
b) I_a becomes twice, W_m becomes twice
c) I_a , W_m remains unaffected
d) I_a , W_m both becomes twice
- iii) A single phase transformer has turns ratio of 1:2 & is connected to a purely resistive load. The magnetizing current drawn is 1 A & the secondary current is 1A. If core losses & leakage reactance's are neglected, the primary current is
- a) 1.41 A b) 2 A c) 2.24 A d) 3 A
- iv) In a dc machine which of the following statement is true
- a) Compensating winding is used for neutralizing armature reaction while interpole winding is used for producing residual flux
b) Compensating winding is used for neutralizing armature reaction while interpole winding is used for improving commutation
c) Compensating winding is used for improving commutation while interpole winding is used for neutralizing armature reaction
d) Compensating winding is used for improving commutation while interpole winding is used for producing residual flux
- v) In case of pulse transformers, small lengths of magnetic circuits is used so as to
- a) reduce winding resistance b) increase magnetizing inductance
c) reduce magnetizing inductance d) increase winding resistance

- vi) Magnetic stored energy density given by
 a) $0.5 BH$ b) $0.5 \mu H^2$ c) both a & b d) none of these
- (6) b) The relay shown in following figure is made from infinitely permeable magnetic material with a movable plunger. calculate the magnetic stored energy as a function of plunger position for $N = 1000$ turns, $g = 2\text{mm}$, $d = 0.15\text{M}$, $l = 0.1\text{M}$ & $i = 10\text{Amp}$. where ($0 < x < d$)
- 
- (6) a) coil is placed & excited by dc source. derive an expression for Force experienced by iron bar and mechanical power developed. if L is the inductance of coil & M is the mass of iron bar
- (6) b) State constructional features of pulse transformer & write its applications
- (6) c) Draw a labeled sketch of 4-pole dc machine & state the significance of back emf in dc motors

Q.2 a) Explain Volt-Second balance in case of transformers & derive an expression for effective emf induced in the low and high voltage windings

b) A single phase transformer on no load draws a current of 5 A, Primary is connected to 230 V, 50 Hz supply, Power loss in the core is 400 Watt.

Calculate i) Apparent power ii) Reactive power iii) Magnetizing component of current iv) core loss component of current

Q.3 a) With the aid of neat circuit diagram explain back to back test on two single phase transformers. State the purpose of performing this test

b) A 10 kVA, 1.1 kV/440 V, 50 Hz, 1- ϕ , two winding transformer is converted in to an autotransformer by connecting two windings in series. Find maximum kVA rating when i) Maximum output voltage is 440 V ii) Maximum output voltage is 1.1 kV

Q.4 a) With the aid of neat connection diagram & phasor diagrams explain the operation of Delta/star zigzag transformer

b) A 3- ϕ , delta/ star connected, 150 kVA, 11kV/400 V, 50 Hz, transformer gave following test results

| | | | |
|--------------|-----------|------------|--------------------|
| O.C.Test(LV) | 10A(Line) | 400 V(L-L) | 2kW(3- ϕ) |
| S.C.Test(HV) | 8A (Line) | 600 V(L-L) | 3.5 kW(3- ϕ) |

Calculate equivalent circuit parameters.

Q.5 a) With the aid of neat circuit diagram & phasor diagrams explain operation of Scott connected transformer to get single phase power supply

b) Draw neat circuit diagram for following dc generators & write their Voltage & current equations i) long shunt compound ii) series generator

Q.6 a) Explain armature reaction in dc generators & state its effects

b) A 4-Pole dc shunt generator with a shunt field resistance of 100Ω & an armature resistance of 1Ω has 378 wave connected conductors in its armature. the flux per pole is 0.02 Wb. if load resistance is 10Ω connected across the armature terminals & the generator is driven at 1000 rpm . Calculate the power absorbed by the load.

Q.7 a) Solve any two from following

(6) An iron bar is connected to a wall through a spring nearby which an air cored