First Mid-term Examination

Sub.- Protection of power system (PPS)

Q.1 (a): Explain the types of faults?

Ans:⇒ faults can be classified in two ways which are as follows

(a) Symmetrical faults

(b) unsymmetrical faults

(a) Symmetrical faults:⇒ A three Phase fault is called a Symmetrical type of fault In a three Phase fault all the three Phases are Short circuited All three Phases may be Short circuited to the ground or they may be Short-circuited without involving the ground. It is most Servere or dangerous fault in a Power System

(b) unsymmetrical faults:⇒

(i) Single Phase-to-ground (L-G) fault

(ii) Double line to-ground (2L-G) fault

(iii) Phase-to-phase fault

(iv) open Circuited Phases

(v) winding faults

~~Q.1(a)~~

(b) ; Explain trip circuit of circuit breaker ? draw digram

Ans:→ The basic connection of the circuit breaker for the opening of operation under fault condition is shown in figure 1.2 Shown in figure 1.2 figure 1.2 shows the Single Phase Systems for the sake of simplicity.

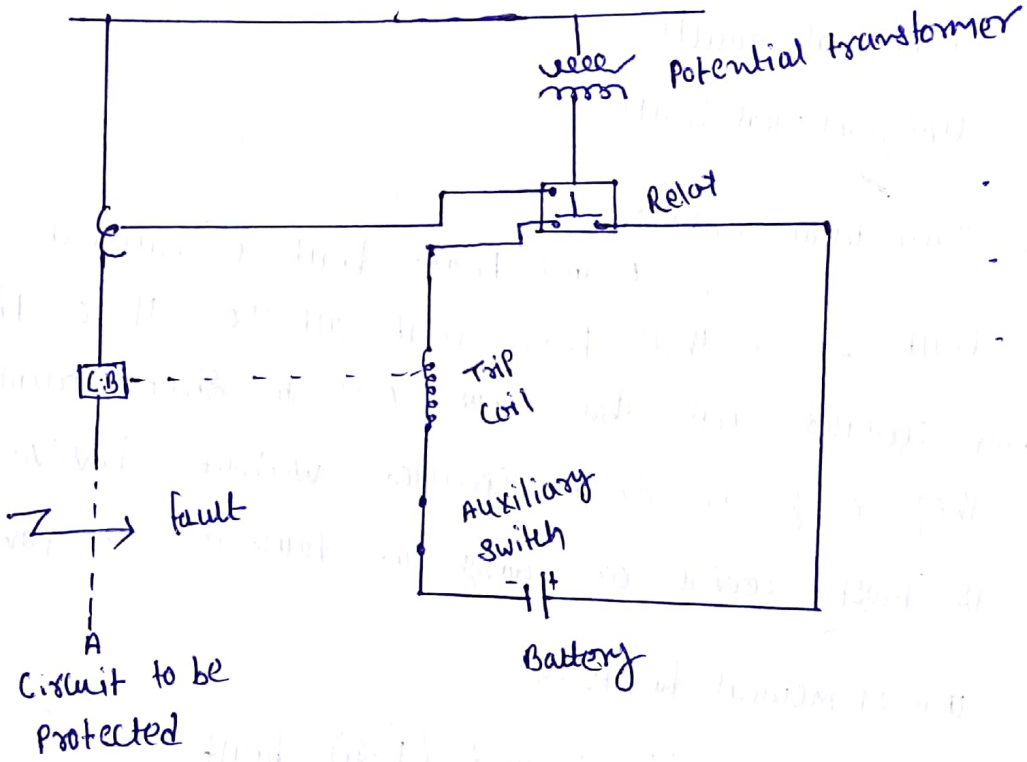

fig:- Trip Circuit of a circuit breaker

The protection section is shown by dashed line usually. the contact circuit of relays is very complicated and the relay circuit is a three phase circuit Let the circuit to be protected be A The paths of trip circuit of a circuit breaker are the relay contacts The trip circuit also consists trip coil and battery and can operate both in a.c and d.c

Q.2

(a) Explain difference between current and Potential transformer ?

Ans:→

S.NO	Current transformer	Potential transformer
(1)	It may be considered as Series transformer with its secondary winding under short circuit condition	(1) It may be thought as parallel transformer with its secondary winding under open circuit condition
(2)	The primary winding current in a current transformer is indepnd of the secondary winding circuit conditions	(2) The primary winding current Potential transformer strictly depends on the secondary winding circuit condtion
(3)	Current transformer is connected in series with one line and a small voltage exists across its terminals	(3) Full line voltage appears across the terminals of potential transformer.
(4)	Line voltage is not constant in current transformer	(4) Line voltage is nearly constant in potential transformer
(5)	The flux density and exciting current vary over wide limits	(5) The flux density and the exciting current varies only over a limited range.

(b) A Current transformer has a single turn in primary and 400 Secondary turns The magnetising Current is 100A A while Core loss Current is 50A Secondary phase angle is 30°

Calculate the Primary Current and ratio error when secondary Carrier 5A Current.

Ans:-

$I_m = 100A$

$I_e = 50A$

$\delta = 30°$

$I_s = 5A$

$n = \frac{N_s}{N_p} \Rightarrow \frac{400}{1} = 400$

$K_n = \frac{I_p}{I_s} = \frac{N_s}{N_p} = 400$

$K = n + \frac{I_m \sin\delta + I_e \cos\delta}{I_s}$

$K \Rightarrow \frac{400 + 100 \sin 30° + 50 \cos 30°}{5}$

$K \Rightarrow 418.66$

$I_p =$ Actual Primary Current

$K I_s$

$\Rightarrow 418.66 \times 5 \Rightarrow 2093.30$

Ratio error $\Rightarrow \frac{K_n - K}{K} \times 100$

$\Rightarrow -4.45\%$. Ans