Probable

Mod-1
SGPD
EE/EEE
7th

MCQ

① A Transmission line has self and mutual impedance of 0.8 PU and 0.2 PU. Find positive negative and zero sequence impedance.

(A) 0.6, 0.8 and 1.2 P.U.
(B) 0.6, 0.6 and 1.2 PU.
(C) 0.8, 0.8 and 1.2 PU
(d) 0.8, 0.6 and 1.2 PU.

HINT:- $Z_0 = Z_s + 2Z_m$

$Z_1 = Z_2 = Z_s - Z_m$.

2. Positive, negative and zero sequence impedance of line are 2.2 and 5 P.U respectively. Find self and mutual impedance respectively.

(A) 1 and 3 PU (B) 3 and 1 PU
(C) 2 and 2 PU (D) 2 and 5 PU.

3. For symmetrical network, the neutral current is

(A) Zero (B) is (C) maximum (D) any of these.

4. When a reactance grounding is used in network, the voltage between neutral and ground is

(A) $I_N \cdot X_N$ (B) $I_{R0} \cdot X_n$ (C) $3I_{R0} \cdot X_n$ (D) both B & C.

5. The value of inductance used for compensation of arcing ground is

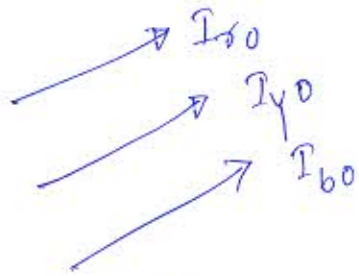
(A) $3\omega^2 c$ (B) $1/3\,\omega^2 c$ (C) $3/\omega^2 c$ (D) $\omega^2 c/3$

6. Earth Fault relay uses the which of following sequence current

(A) Positive sequence (B) Negative sequence

(C) Zero sequence (D) any of above.

7. which sequence component is represented by the following phasor.



(a) Positive sequence (b) Zero sequence.

(c) Negative sequence (d) None of these.

(8) what is the value of $(1+a+a^2)$?

(a) 0 (b) 1 (c) -1 (d) ∞

(9) What is the value of zero sequence current

a. 3 times the current in the neutral wire.

b. $\frac{1}{3}$ times of the current in neutral wire.

c. $\sqrt{3}$ times the current in the neutral wire.

d. Equal to current in the neutral wire

(10) The +ve sequence current is always equal to _____

a. Always zero (b) 1/3 of the negative seq. current

c. negative sequence current (d) 3 times of -ve.

(11) What is the purpose of backup protection

(a) To increase the speed (b) To increase the reach.

(c) To leave no blind spot (d) To guard against failure of primary

(12) What is the actuating quantity for the relay

a. magnitude (b) Frequency (c) phase angle (d) all

(13) On what factors does the operating speed of relay depend upon

a. Rate of flux built up (b) armature core air gap

b. Spring tension (d) all of above

7. in Above Question (Q-6) what is Zero Sequence Current.

Ans:- $\vec{I_0} = \frac{1}{3}\left[\vec{I_R} + \vec{I_Y} + \vec{I_B}\right]$

$= \frac{1}{3}\left[100\angle 30^\circ + 50\angle 300^\circ + 30\angle 150^\circ\right]$

$= \frac{1}{3}\left[81.6 + j6.7\right] = 27.2 + j2.23$

$= 27.29\angle 4.68^\circ A$.

8. Prove that $\frac{1-a^2}{a-a^2} = -a$

Ans:- $\frac{1-a^2}{a-a^2} = \frac{(1+a)(1-a)}{a(1-a)} = \frac{1+a}{a} \quad (1+a+a^2=0)$

$= \frac{-a^2}{a} = -a$

(14.) Plug setting of a electromagnetic relay can be altered by varying

a. Number of ampere-turn b- Air gap of magnetic path

c- Adjustable back stop d- none of these.

Module-1

Short Question Answers:-

1. What are the essential Qualities of a Protective relaying System.

Ans:- The essential Qualities of a Protective relaying System are (i) good Economy (ii) Faster speed of operation (iii) reliability (iv) sensitive (v) Simple.

2. What are the Function of Protective relay

Ans:- The main Function of Protective relay is to detect the Presence of abnormal Condition and initiate the operation of switchgear so as to isolate the Faulty section from healty Section as soon as Possible to limit the Damage Possible.

3. What are the various Cause of Fault in power System.

Ans:- The various causes of fault in Power System are

(i) Breakdown occure at normal voltage on account of deterioration of insulation, damage due to

perching of birds, kites, Tree branch etc.

(ii) Breakdown due to Switching surge and lightning surge.

4. Distinguish between Primary and Backup Protection.

Ans:- In a primary or main Protection the fault may be clear in First stage. But if the fault clerance is not possible in Primary protection backup Protection is needed. So Primary Protection is First line of defence and Backup Protection is Second line of defence.

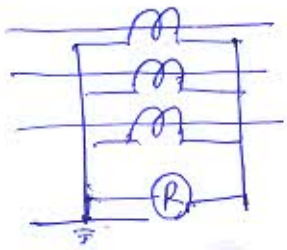
5. What are the different Component of Protection

Ans:- The different Component of Protection are

(a) Current Transformer.
(b) Potential Transformer.
(c) Relay.

6. What is Zero sequence network. Draw neatly a zero sequence network.

Ans:- In some case it is desirable to make the Protection to respond to a particular Phase-sequence component of 3ϕ System of current or voltage.



7. What is Unit and non-unit type of Protection.

Ans:- in Unit Protection there are presence of C.T and P.T in Protected zone. in non unit Protection C.T and P.T are absent. Propere Current or voltage balance is not possible in non-unit Protection.

8. What is the difference between Protection C.T and Measuring C.T.

Ans:- for metering purpose the C.T will measure The amount of Electrical Energy Consumed by a Power load and in Protection purpose it will step-down the high Current to a low value so that the Faulty circuit is isolated during S.C or Fault condition.

9. What is zone of Protection?

Ans:- i) Protection zone is defined as the Part of Power System which is Protected by a certain Protective scheme. it is established around each Power System equipment.

ii) The basic idea of zone of Protection is to Provide a ring of security around each element so that no part or element remain Unprotected.

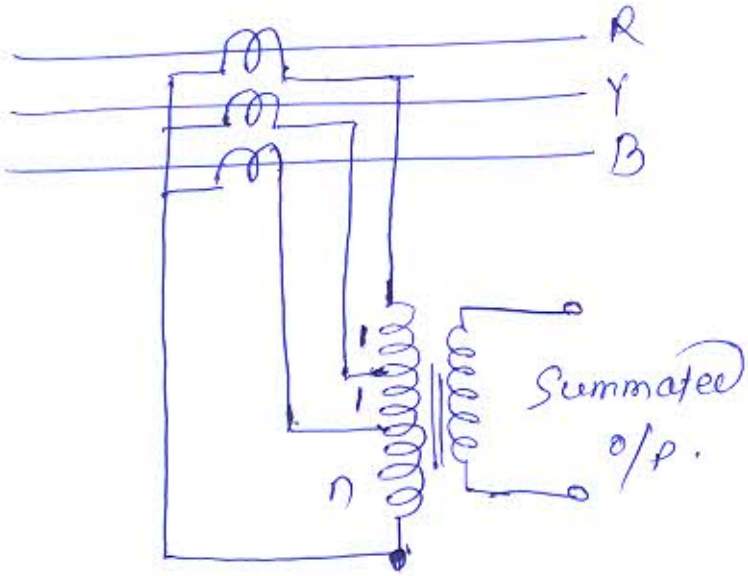
(10). What are the various methods for ~~derivi~~ deriving Single-phase Quantity from Three phase System.

Ans:- The methods are

(i) Summation Transformer

(ii) Sequence network.

Summation Transformer



Short Question and Answere

Q-11 What is Un Symmetrical Fault?

Ans:- These fault on the power System which gives rise to Unsymmetrical Fault Current i.e. unequal Fault Current in line with unequal phase displacement.

Q-12 What is the sequence impedance of Transformer?

Ans:- positive sequence impedance = Negative sequence impedance.

Zero sequence impedance = Positive sequence impedance if there is circuit for earth current.

= ∞, if there is no through cut for earth current.

13. What is the significance of operator 'a'

Ans:- The operater 'a' is one which when multiplied to a vectore rotates the vector through 120° in anticlock-wise direction.

$$\boxed{aI = I\angle 120^\circ}$$

14. What are the examples of unsymmetrical fault?

Ans:- The different types of unsymmetrical faults are

(a) L-G fault.
(b) L-L fault.
(c) LL-G fault.

15. What will be the value of zero sequence current in 3φ, 4 wire unbalanced system.

Ans:- Zero sequence current $= \frac{1}{3}$ [current in Neutral wire]

16. In a 3 phase 4 wire system, the current in R, Y and B line under abnormal condition of loading are as under.

$\vec{I_R} = 100\angle 30^\circ A$; $\vec{I_Y} = 50\angle 300^\circ A$, $\vec{I_B} = 30\angle 180^\circ A$.

a calculate +ve seq. current.

Ans:-

$$\vec{I_1} = \frac{1}{3}\left[\vec{I_R} + a\vec{I_Y} + a^2\vec{I_B}\right]$$

$$= \frac{1}{3}\left[100\angle 30^\circ + 1\angle 120 \times 50\angle 300^\circ + 1\angle -120 \times 30\angle 180^\circ\right]$$

$$= \frac{1}{3}\left[126.6 + j119.28\right]$$

$$= (42.2 + j39.76) = 57.98\angle 43.3^\circ A.$$