

SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

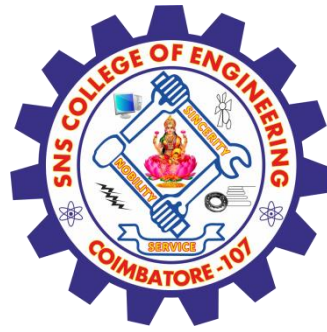
COURSE NAME : 19EE605 PROTECTION AND SWITCHGEAR

III YEAR /VI SEMESTER

Unit 2- ELECTROMAGNETIC RELAY

Topic: Hinged Armature Type Relay

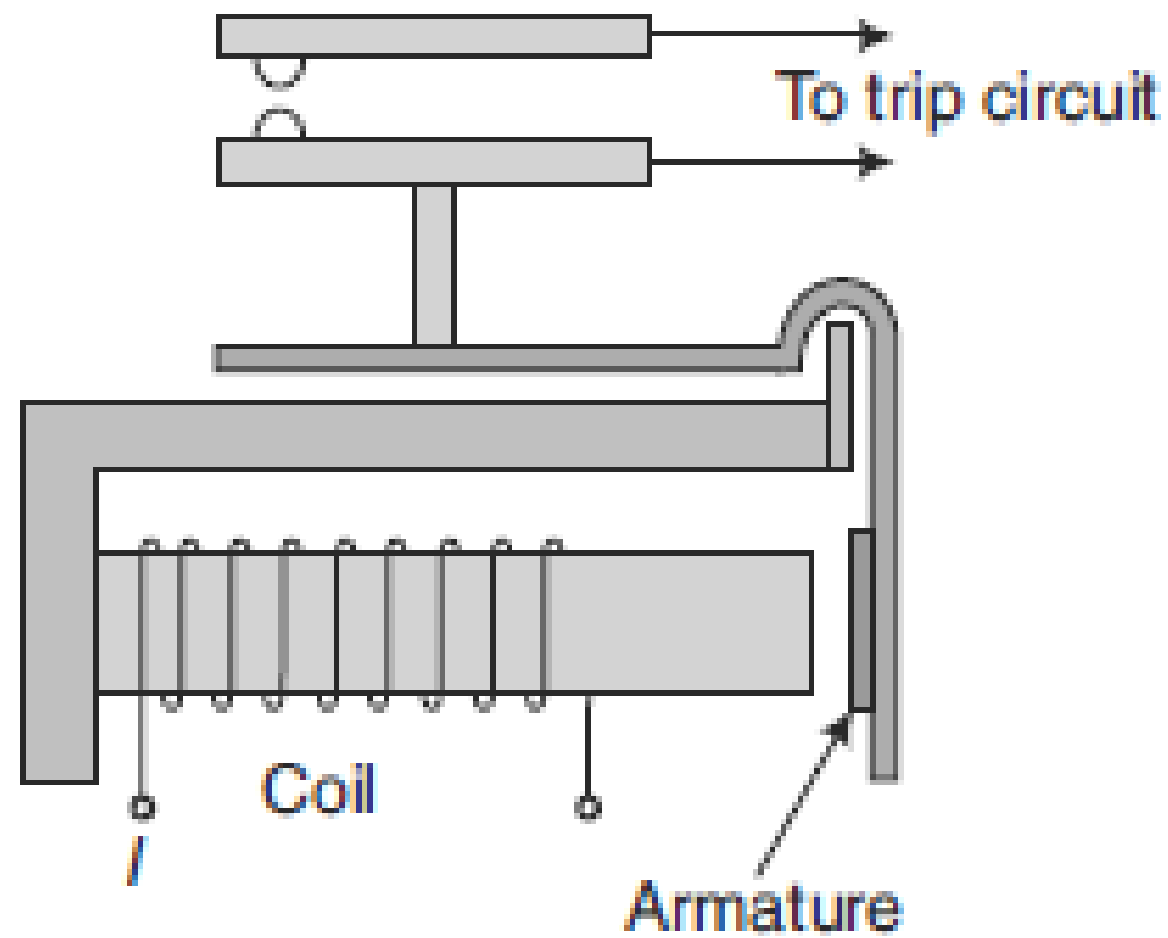




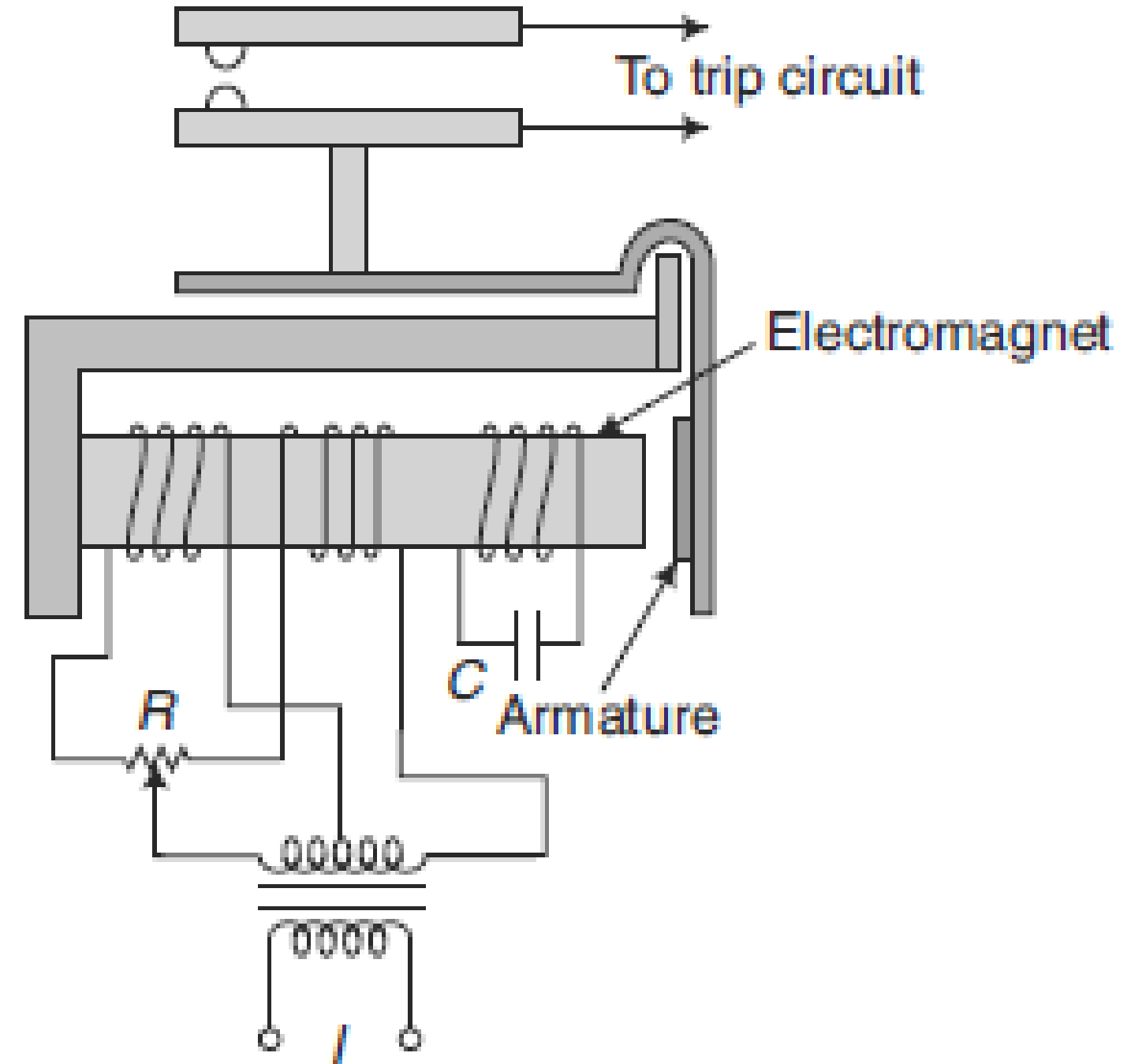
The following are the different types of construction of attracted armature relays.

- (i) Hinged armature type
- (ii) Plunger type
- (iii) Balanced beam type
- (iv) Moving-coil type
- (v) Polarised moving-iron type
- (vi) Reed type

Hinged Armature-Type Relays



(a)



(b)

(a) Hinged armature-type relay (b) Modified hinged armature-type relay



➤ Figure (a) shows a hinged armature-type construction. The coil is energised by an operating quantity proportional to the system current or voltage.

- The operating quantity produces a magnetic flux which in turn produces an electromagnetic force.
- The electromagnetic force is proportional to the square of the flux in the air gap or the square of the current.
- The attractive force increases as the armature approaches the pole of the electromagnet.
- This type of a relay is used for the protection of small machines, equipment, etc.
- It is also used for auxiliary relays, such as indicating flags, slave relays, alarm relays, annunciators, semaphores, etc.



- The actuating quantity of the relay may be either ac or dc.
- In dc relay, the electromagnetic force of attraction is constant.
- In the case of ac relays, sinusoidal current flows through the coil and hence the force of attraction is given by

$$F = K I^2 = K (I_{\max} \sin \omega t)^2 = \frac{1}{2} K (I_{\max}^2 - I_{\max}^2 \cos 2\omega t)$$

- It is evident that the electromagnetic force consists of two components.
- One component is constant and is equal to $\frac{1}{2} K I_{\max}^2$.
- The other component is time dependent and pulsates at double the frequency of the applied ac quantity.



Assessment



1. What is the main function of a relay?
 - A) To amplify the current in a circuit
 - b) To control the flow of current in a circuit.
 - c) To store energy in a circuit
 - d) None of these





Assessment



1. An electromagnetic attraction type relay operates on.....

- a) Pulsating DC
- b) AC only
- c) DC only
- d) Both AC and DC.





References



1. SuniS Rao, “Switchgear, Protection and Power System (Theory, Practice & Solved Problems)”, Khanna Publishers, New Delhi, 2019.
2. Paithankar Y G, Bhide S R, “Fundamentals of Power System Protection”, Prentice Hall of India Pvt Ltd., New Delhi, 2nd Edition, 2014.
3. Badriram, Vishwakarma B.H, “Power System Protection and Switchgear”, New Age International Pvt Ltd Publishers, 2nd Edition 2017.

Thank You