Important Instructions to examiners:

1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
2) The model answer and the answer written by candidate may vary but the examiner should assess the understanding level of the candidate.
3) The language errors such as grammatical, spelling errors should not be given importance.
   (Not applicable for subject English and Communication Skills).
4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner should give credit for any equivalent figure/figures drawn.
5) Credits to be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer (as long as the assumptions are not incorrect).
6) In case of some questions credit may be given by judgment on part of examiner of relevant answer based on candidate's understanding.
7) For programming language papers, credit may be given to any other program based on equivalent concept

1 **a)** **Attempt any <u>THREE</u> of the following:** **12**

1 a) (i) State any four differences between symmetrical and asymmetrical fault. (any four points)

Ans:

Difference between symmetrical and asymmetrical fault:

Sr. No.	Symmetrical fault	Asymmetrical fault
1	The fault on the power system which gives rise to symmetrical fault currents in the system is called symmetrical fault.	The fault on the power system which gives rise to unsymmetrical fault currents in the system is called unsymmetrical fault.
2	These faults occur very rarely in practice.	These faults occur for majority of times in practice.
3	It is more severe type of fault in nature.	It is comparatively somewhat less severe type of fault.
4	The nature of this type of fault is balanced.	The nature of this type of fault is unbalanced.
5	Because of balance nature of fault, only one phase need to be considered in calculations.	Because of unbalance nature of fault, all three phases need to be considered in calculations.
6	Symmetrical fault imposes more heavy duty on circuit breakers.	Unsymmetrical fault imposes somewhat less duty on circuit breakers.
7	Symmetrical fault calculations and analysis is comparatively simple & easy.	Unsymmetrical fault calculations and analysis is complicated & tedious.
8	Symmetrical faults involve all the three phases.	Unsymmetrical faults involve one or two phases.
9	Examples: (a) L-L-L Fault (b) L-L-L-G Fault.	Examples: (a) L-G Fault (b) L-L-G Fault (c) L-L Fault etc.

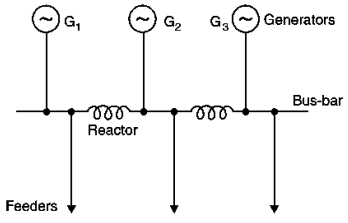
Each point 1 Mark (any four points) = 4 Marks

1 a) (ii) Draw neat circuit diagram of

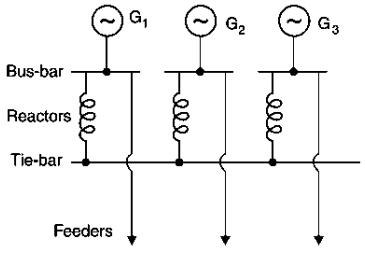
1) Bus bar reactor
2) Feeder reactor
3) Generator reactor

Ans:

1) Bus bar reactor



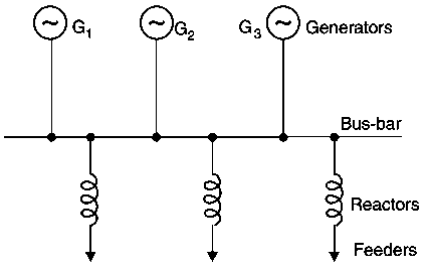
Ring system



Tie - Bar system

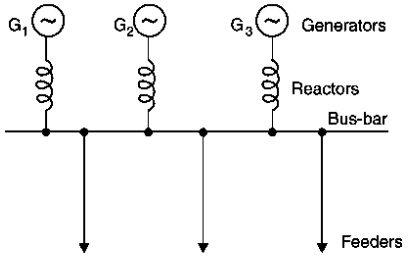
2 Marks

2) Feeder reactor



1 Mark

3) Generator reactor

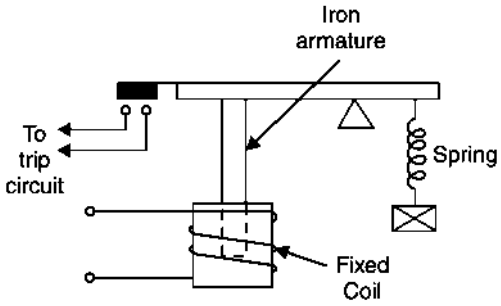


1 Mark

1a) (iii) Draw neat circuit diagram of Balanced beam type relay.

Ans:

Balanced Beam Type Relay:



Labeled diagram 4 Marks

Partially Labeled diagram 3 Marks

Un-Labeled diagram 2 Marks

1a) (iv) State any four properties of good protective system.

Ans:

Properties of good protective system:

i) **Selectivity:** It is the ability of protective system to select correctly that part of system in trouble and disconnect the faulty part without disturbing the rest of the system.

ii) **Speed:** The relay system should disconnect the faulty section as fast as possible to prevent the electrical apparatus from damage and for system stability.

iii) **Sensitivity:** It is the ability of the relay system to operate with low value of actuating quantity.

iv) **Reliability:** It is the ability of the relay system to operate under predetermined conditions.

v) **Simplicity:** The relay system should be simple so that it can be easily maintained.

vi) **Economy:** The most important factor in the choice of particular protection

Each point 1 Mark (any four points) = 4 Marks

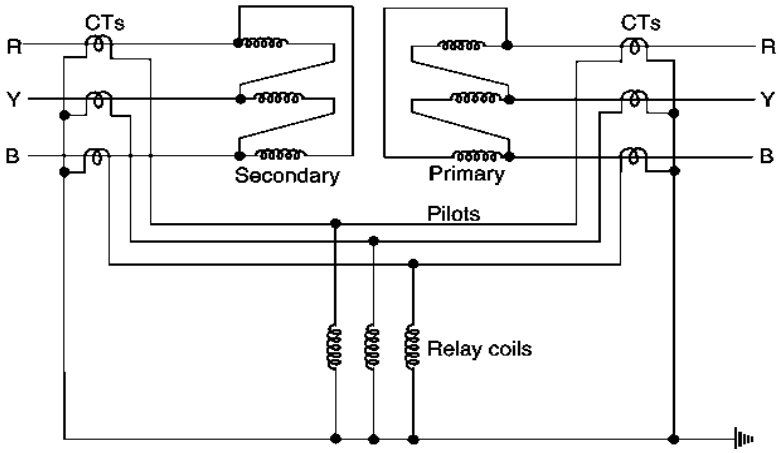
scheme is the economic aspect. The protective gear should not cost more than 5% of the total cost of equipment to be protected.

1 b) **Attempt any ONE of the following:** **6**

1 b) (i) Draw circuit diagram for ~~men~~ merz price protection scheme for Delta-Delta (D-D) connected 3ϕ phase power transformer.

Ans:

Merz price protection scheme for Delta-Delta(D-D) connected 3ϕ phase Power Transformer:



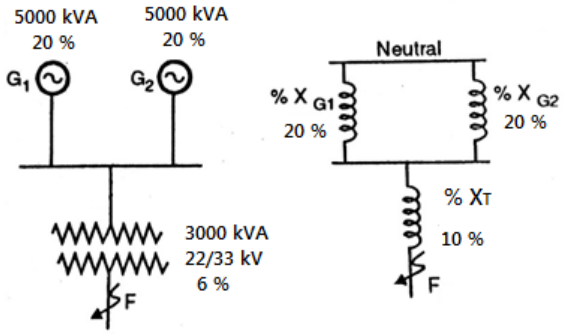
Labeled diagram 6 Marks

Partially Labeled diagram 5 Marks

Un-Labeled diagram 4 Marks

1 b) (ii) Two 11kV, 3 phase, 5000kVA generators having reactances of 20% operate in parallel. The generator supply power to transmission line through 3000kVA transformer of ratio 22kV/33kV having leakage reactance of 6%. Calculate Fault kVA on H.T. side of transformer.

Ans:



1 Mark for reactance diagram

Assume base KVA = 5000 KVA

% Reactance related to base KVA

% X = (Base KVA / Rated KVA) x % Reactance on Rated KVA

X_{G1} = (5000/5000) x 20%

= 20 %

Similarly,

X_{G2} = 20 %

X_T = (5000/3000) x 6

= 10 %

2 Marks for reactance calculation

For Fault F (HT side)

Total reactance is %X = (X_{G1} || X_{G2}) + X_T

= (20||20)+10 = 10 + 10
% X = 20 %

Rated current at base KVA
I = (5000 x 1000) / (√3 x 33 x 1000)
I = 87.477 Amp.

I_{SC} = I x (100 / % X)
= 87.477 x (100 / 20)
I_{SC} = 437.385 amp

2 Marks for stepwise solution of I_{SC}

S.C. KVA = Base KVA x (100/ % X)
= 5000 x (100 /20)
= 25000 KVA
S.C. MVA = 25 MVA

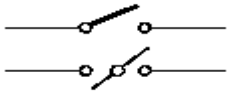
1 Mark for SC MVA

2 Attempt any FOUR of the following: 16

2a) Draw symbol of
(i) Isolator
(ii) Circuit breaker
(iii) Earthing switch
(iv) Lightning arrester

Ans:

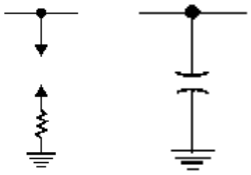
(i) Isolator :



(ii) Circuit breaker:

(iii) Earthing switch:

(iv)Lightning arrester:



1 Mark for each valid symbol = 4 Marks

2b) Compare Fuse and MCCB (any four points).

Ans:

Comparison between fuse and MCCB:

Sr. No.	Fuse	MCCB
1	Fuse melts / fuses in case of excessive load.	MCCB trips off in case of excessive load.
2	Fuse needs to be replaced after every operation.	MCCB is to be just put ON after correcting the fault.
3	Porcelain base and top. Not attractive.	Compact, small and attractive.

1 Mark for each of any four valid points of comparison = 4 Marks

4	Works on melting / fusing due to high temperature.	Works on bi–metal expansion or induced magnetism.
5	Relatively economical than MCCB.	Relatively costlier than fuse.
6	Simple in construction.	Complicated in construction.
7	Operating time is very small. (0.002 sec or so)	Operating time is comparatively large. (0.1 to 0.2 sec)
8	Risk in putting on the fuse element.(Unsafe)	No risk in putting "ON" the MCCB. (Safe).
9	Generally protects the load against short-circuit.	Generally protects the load against different types of faults.

2 c) Define the following terms:
(i) Arc voltage
(ii) Recovery voltage
(iii)RRRV
(iv) Restriking voltage

Ans:

i) Arc Voltage: The voltage existing between the circuit breaker contacts during arcing is called as the arc voltage.

ii) Recovery voltage: The normal power frequency voltage that appears across the contacts after the arc is finally extinguished and the transients have fully disappeared is the recovery voltage.

iii) RRRV: The RRRV (rate of rise of the restriking voltage) is defined as the slope of the steepest tangent to the restriking voltage curve. It is expressed in volts per micro-second.

iv) Restriking voltage: The transient voltage that appears across the contacts of the circuit breaker at the instant of the arc getting extinguished is called as the restriking voltage.

1 Mark for each definition = 4 Marks

2 d) Explain with neat diagram rod gap type lightning arrestor.

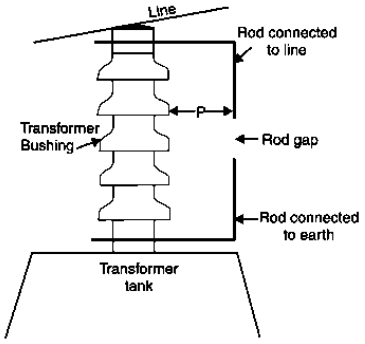
Ans:

Rod Gap Type Lightning Arrestor:

It consists of two 1.5cm rods which are bent at right angles with a gap in between as shown in figure. One rod is connected to line and other rod is connected to earth.

Under normal operating conditions the gap remains non-conducting. On the occurrence of high voltage surge on the line, the gap sparks over and the surge current is conducted to earth safely.

2 Marks for explanation

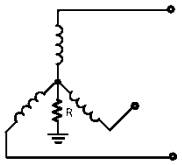
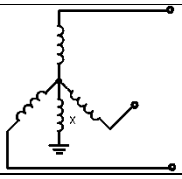


2 Marks for diagram

2e) Compare Resistance earthing and Reactance earthing. (any four points)

Ans:

Comparison between Resistance earthing and Reactance earthing:

Sr. No.	Resistance earthing	Reactance earthing
1.		
2.	Neutral is connected to ground through resistance	Neutral is connected to ground through inductance
3.	Economical	Expensive
4.	Minimizes arcing earth faults	Made arcing earth faults self-extinguishing
5.	Suitable for high capacity lightning arrestor	Suitable for low capacity lightning arrestor
6.	Suitable for moderate capacity circuit breakers	Suitable for low capacity circuit breakers
7.	Used upto 33kV system	Used above 33kV system.

1 Mark for each of any four valid points of comparison = 4 Marks

2f) Draw neat circuit diagram of solenoid type relay.

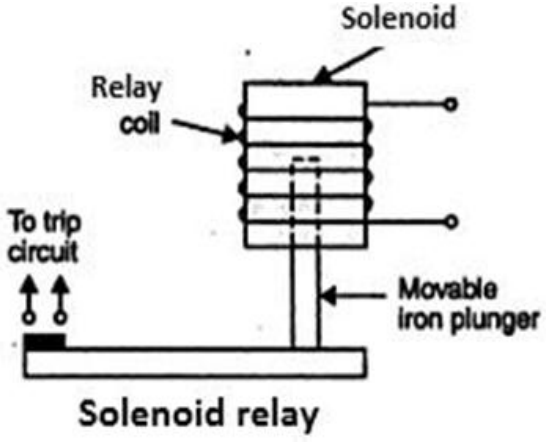
Ans:

Solenoid Type Relay:

Labeled diagram 4 Marks

Partially Labeled diagram 3 Marks

Un-Labeled diagram 2 Marks



Solenoid relay

3 Attempt any <u>FOUR</u> of the following: **16**

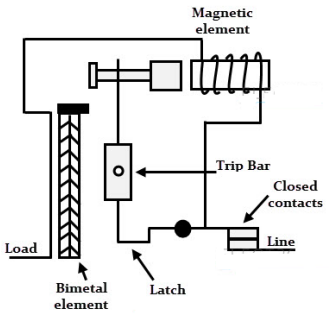
3a) Draw and explain neat circuit diagram of MCB.

Ans:

Miniature Circuit Breaker (MCB):

MCB is used to provide protection against overloads and short circuits. It consists of inbuilt thermal bimetal element and electromagnetic coil. The bimetal heats up and bends in response to overcurrent conditions to unlatch a spring operated mechanism to open the contacts. Under short circuit condition, the heavy current passing through magnetic coil produces sufficient pull to separate the contacts thus provides protction against short circuit.

2 Marks for explanation

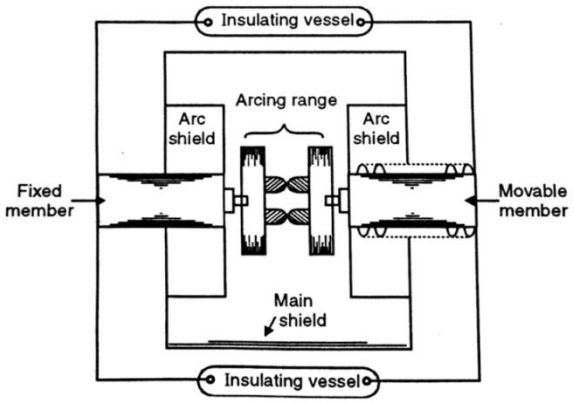


2 Marks for diagram

3b) Draw and explain neat circuit diagram of Vacuum Circuit Breaker.

Ans:

Vacuum Circuit Breaker:



Vacuum circuit breaker

2 Marks for diagram

Explanation:

During the operation of the breaker, the moving contact separates from the fixed contact resulting in arcing between them. The production of arc is due to the ionization of metal ions and depends very much upon the materials of contacts. The arc is quickly extinguished because the metallic vapours, electrons and ions produced during arc are diffused in a short time and seized by the surface of moving and fixed members and shields. The arc gets extinguished quickly as vacuum has good recovery of dielectric strength. The arc extinction occurs at a small vacuum gap of about 0.6 to 0.7cm.

2 Marks for explanation

3c) Write function of Buchholz relay and state application of it for transformer protection

Ans:

Function of Buchholz relay:

It is used for the protection of transformers from the faults occurring inside the transformer. Short circuit faults such as inter-turn faults, incipient winding faults, core faults etc. may occur due to the impulse breakdown of the insulation. To protect transformer against these faults, Buchholz relay is used.

2 Marks

Appliction of Buchholz relay for transformer protection:

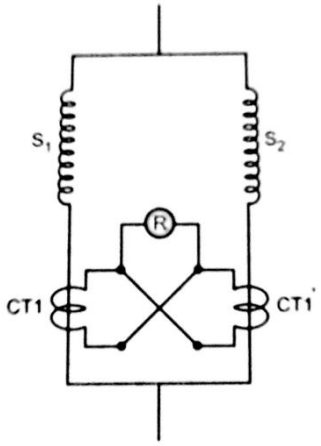
It is universal practice to use Buchholz relay on all oil immersed transformers having rating in exess of 750 kVA at generation power plant, receving sub-station, distribution sub-station, power transformers in industry etc.

2 Marks .

3d) Draw neat circuit diagram of Inter-turn protection for transformer.

Ans:

Inter-turn protection for transformer:



Labeled diagram 4 Marks

Partially Labeled diagram 3 Marks

Un-Labeled diagram 2 Marks

S_1 and S_2 are the turns of one of the same phase of transformer winding.

3e) State various Abnormalities taking place in case of alternator.

Ans:

Various abnormalities taking place in case of alternator:

1) Thermal overheating.
2) Overloading.
3) Loss of field.
4) Under/Over frequency.
5) Too much vibrations.
6) Bearing overheating.
7) Motoring of generator.
8) Over voltages.
9) Over speed.
10) Over current.
11) Failure of prime-mover.

Each point ½ Mark (any 8 points) = 4 Marks

3f) Write any four safety precautions while using CT and PT.

Ans:

Safety precautions while using C.T. and P.T.:

i) CT secondary terminals should never be kept open. CTs must be energized only after connecting the burden across them.
ii) PT secondary should never be shorted as they are designed for high impedance burdens (extremely low currents).
iii) To be used as per the specified rating of voltage, current & burdens only. The burdens should never be exceeded when multiple ones are connected across one instrument transformer. They are designed to give the highest accuracy at the rated burdens only, else for lower and slightly higher burdens, ratio & phase angle errors are present and compensation is needed.
iv) CTs for measurement must not be interchanged with those for protection and vice versa.

Each point 1 Mark (any four points) = 4 Marks

4 a) Attempt any <u>THREE</u> of the following: **12**

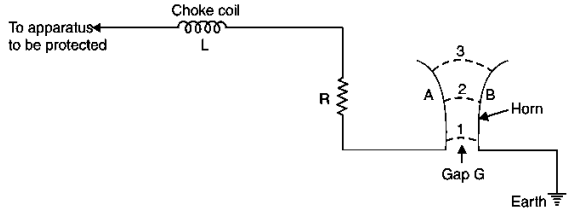
4 a) i) Explain with neat diagram Horn gap type lightning arrester.

Ans:

Horn Gap Type Lightning Arrester:

It consists of two horn shaped metal rods A and B separated by a small air gap. The horns are so connected that distance between them gradually increases towards the top. One end of the horn is connected to the line through resistance and choke coil while other end is effectively earthed. The resistance and inductance limits the current flow at normal frequency and does not allow the transients. Under normal operating conditions the gap G is non-conducting. On occurrence of over voltage, spark takes place across the gap and high voltage is diverted towards earth for safety of equipment. Arc being hot, moves up naturally along the horns. So it is elongated and naturally quenched.

2 Marks for description



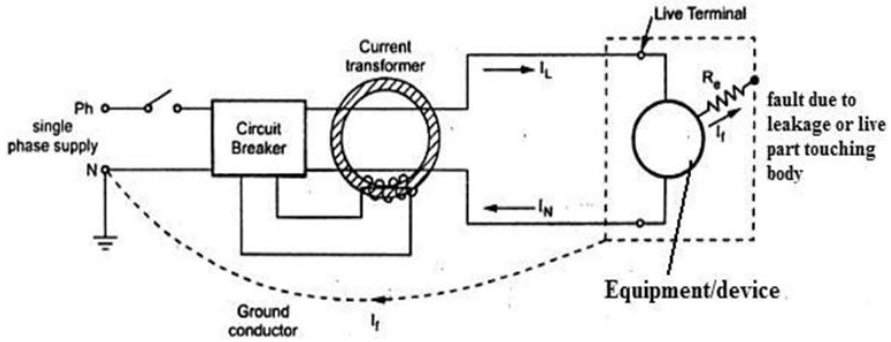
2 Marks for diagram

4 a) ii) Draw neat connection diagram of ELCB for residential installation.

Ans:

Connection diagram of ELCB for residential installation:

Labeled diagram 4 Marks



Partially Labeled diagram 3 Marks

Un-Labeled diagram 2 Marks

4 a) iii) State different faults that occur in alternator.

Ans:

Different Faults in Alternator:

1) Stator winding faults.
2) Thermal overheating.
3) Rotor winding faults.
4) Loss of field.
5) Under/Over frequency.
6) Vibration & Bearing overheating.
7) Motoring of generator.
8) Faults because of external causes.
9) Over voltages.
10) Over current.

Each point ½ Mark (any 8 points) = 4 Marks

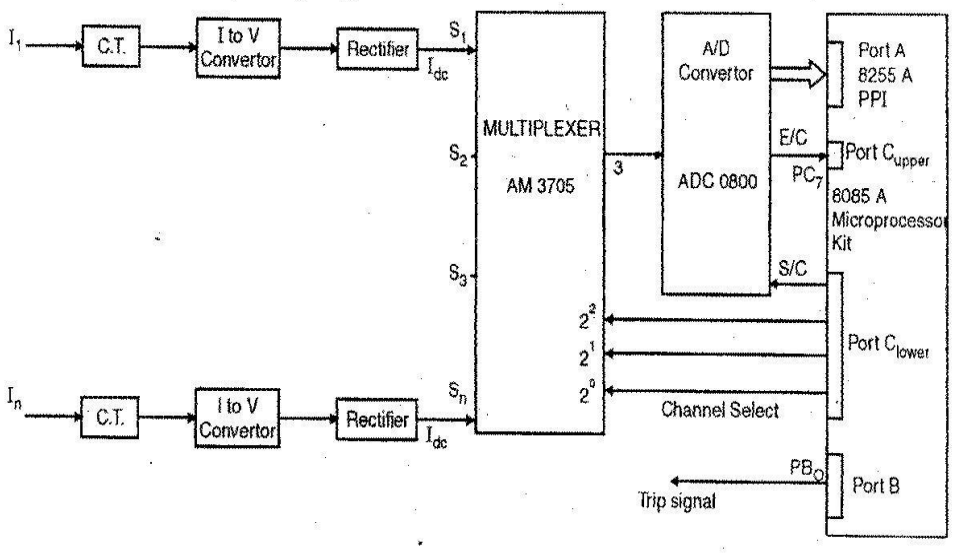
4 a) iv) Explain in brief the operation of microprocessor based overcurrent relay used for protection system.

Ans:

Microprocessor Based Overcurrent Relay:

The ac voltage proportional to the load current is converted into dc through a precision rectifier. Thus the microprocessor accepts dc voltage proportional to the load current. The schematic diagram is shown in the figure. The output of rectifier is fed to the multiplexer. The output of multiplexer is fed to the A/D converter to obtain the signal in digital form. The A/D converter ADC 0800 is used for this purpose. 2 Marks for Explanation

The microprocessor sends signal to the ADC for starting the conversion. The microprocessor reads the end of conversion signal to examine whether the conversion is over or not. As soon as conversion is over, the microprocessor reads the current signal in digital form and then compares it with the pickup value. The microprocessor first determines the magnitude of the fault current and then selects the corresponding time of operation from the look up table. Then it goes in delay subroutine and sends a trip signal to the circuit breaker after the predetermined time delay.



Schematic diagram of microprocessor based over current relay

2 Marks for diagram

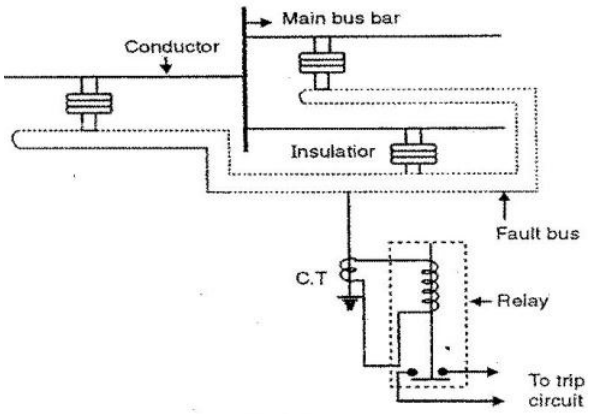
4 b) Attempt any ONE of the following. 6

4 b) i) Explain with neat diagram fault bus protection for Bus bar protection.

Ans:

Fault bus protection of bus-bar:

Here substation is so designed that every fault on the bus bar is converted to earth fault. Under normal operating conditions, there is no current flowing through the fault bus to ground and the relay remains inoperative. When any fault occurs on bus-bar involving a connection between conductor and earthed support structure, it will cause a flow of current to earth through the fault bus. This results in operation of relay to actuate trip coil of CB to trip the circuit. 3 Marks for Explanation



Fault bus protection

3 Marks for Diagram

4 b) ii) State the different causes of Abnormalities and faults in Induction motor. Write the operation of single phase preventer.

Ans:

Different Causes of Abnormalities and Faults in Induction motor:

Squirrel Cage Induction Motors:

A) Electrical / magnetic sections:
1) Electrical supply failure due to single phasing, under voltage, unbalanced voltages and reversal of phases.
2) Short circuit faults between turns of a stator coil due to failure of insulation.
3) Short circuit faults between stator coils due to failure of insulation.
4) Short circuit faults between stator coil/s and body of motor due to failure of insulation.
5) Open circuit in stator winding/coils or their terminal connections.
6) Loose or broken rotor bars.
7) Damaged core stampings/teeth.

B) Mechanical section:
1) Unbalanced rotor.
2) Damaged bearings.
3) End play in shaft, bent shaft.
4) Cooling/ventilation system failures, damaged fan.
5) Failure/disturbances of alignment.
6) Foundation arrangement disturbed.

Each point ½ Mark (any 6 points) = 3 Marks

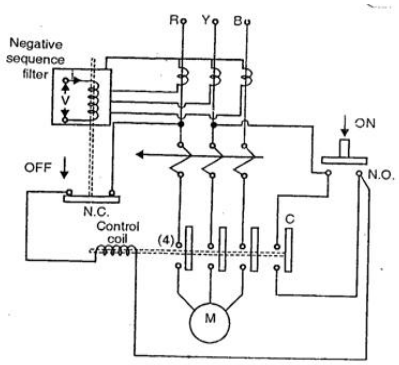
Slip Ring Induction Motors:

A) Electrical / magnetic sections:
1) Electrical supply failure due to single phasing, under voltage, unbalanced voltages and reversal of phases.
2) Short circuit faults between turns of a coil on stator or rotor due to failure of insulation.
3) Short circuit faults between coils due to failure of insulation.
4) Short circuit faults between coil/s and body of motor due to failure of insulation.
5) Open circuit in stator or rotor winding/coils or their terminal connections.
6) Damaged core stampings/teeth of stator or rotor.

B) Mechanical section:
1) Unbalanced rotor.
2) Damaged bearings.
3) Grooved slip rings.
4) Worn out brushes leading to abnormal operation with sparking etc.

5) End play in shaft, bent shaft.
6) Cooling/ventilation system failures, damaged fan.
7) Failure/disturbances of alignment.
8) Foundation arrangement disturbed.

Operation of single phase preventer:



1 Mark for Diagram

Single phasing preventers are generally used for small / medium capacity motors. Single phasing preventers are connected in secondary of line CTs. These mainly contain a negative sequence filter. The output of negative sequence filter is fed to the level detector, which further sends tripping command to starter or CB. When one of the three input lines get disconnected because of any reason, ultimately the NC contact gets opened which stops the motor to avoid further damage when single phasing occurs.

2 Marks for operation

5 Attempt any <u>FOUR</u> of the following **16**

5a) Give any two advantages and two disadvantages of SF_6 CB.

Ans:

Advantages of SF_6 CB:

i) Due to superior arc quenching property, they have very short arcing time.
ii) As SF_6 gas is non-inflammable, no risk of fire.
iii) Noiseless operation.
iv) It does not pollute the atmosphere.
v) Very much suitable in coal mines etc.
vi) They have minimum maintenance cost.
vii) The same gas is recycled and reused.
viii) There are no carbon deposits on contact tips.
ix) It is very much suitable for high voltage applications.
x) Because of very high dielectric strength, effective arc quenching is possible.

1 Mark for each of any two advantages = 2 Marks

Disadvantages of SF_6 CB:

i) SF_6 gas is very costly. Hence this CB is expensive.
ii) SF_6 gas has to be reconditioned after every operation.

1 Mark for each of any two dis-advantages = 2 Marks

5b) Compare kitkat fuse and HRC fuse. (any four points)

Ans:

Comparison of Kitkat fuse and HRC fuse:

Sr. No.	Kitkat fuse	HRC fuse
1	Slow operation	Fast operation
2	Less accurate	More accurate

3	Bulky size	Compact size
4	Economical	Expensive
5	Low reliable	High reliable
6	Not sealed	Fully sealed
7	Properties deteriorate with time	Properties remain unchanged with time
8	Looks very shabby	Good appearence
9	Poor discrimination	Very good discrimination
10	No arc quenching mechanism	Inbuilt arc quenching facility

1 Mark for each valid point of comparison = 4 Marks

5c) Define relay time and pick up current.

Ans:

i) Relay Time : The time interval between occurrence of fault and closure of relay contacts.

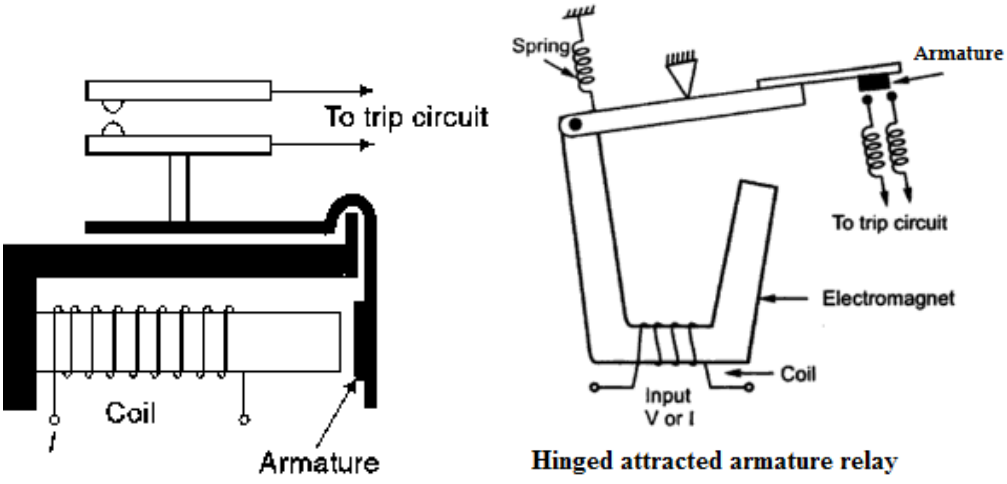
ii)Pickup current: The threshold value of operating current above which the relay operates. **OR** It is the minimum current in the relay coil at which the relay starts to operate.

2 Marks for each definition = 4 Marks

5d) Draw neat circuit diagram of attracted armature type relay.

Ans:

Attracted Armature Type Relay:

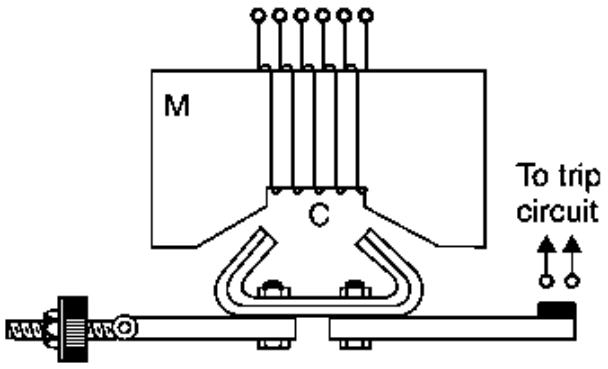


Hinged attracted armature relay

Any one Labeled diagram 4 Marks

Any one Partially labeled diagram 3 Marks

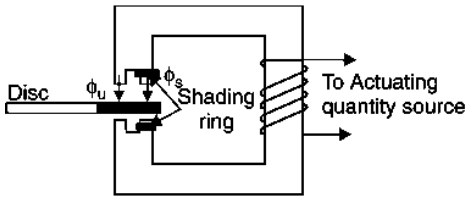
Any one Unlabeled diagram 2 Marks



5e) Explain with neat diagram shaded pole type relay.

Ans:

Shaded Pole Type Relay:



2 Marks for diagram

Explanation:

It consists of a pivoted aluminium disc free to rotate in the air gap of an electromagnet. One half of each pole of the magnet is surrouded by a copper band known as shaded ring. The alternating flux ϕ_s in the shaded portion of the poles will, owing to the reaction of the current induced in the ring lags behind the flux ϕ_u in the unshaded portion by an angle α. These two ac fluxes produce the necessary torque to rotate the disc.

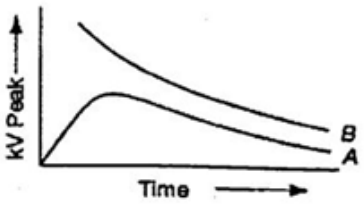
2 Marks for description

5f) Explain in brief the necessity of insulation co-ordination.

Ans:

Necessity of insulation co-ordination:

1 Mark for Graph



3 Marks for Explanation

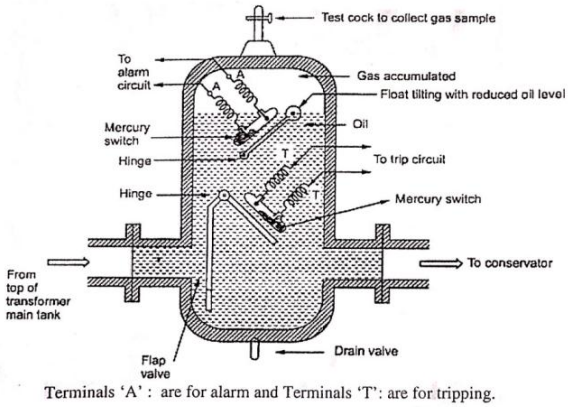
The insulation strength of various equipment like transformers, circuit breakers etc. should be higher than that of lightning arresters and other surge protective devices. The Insulation Co-ordination is thus the matching of the volt time flash over and break down characteristcs of equipment and protective devices in order to obtain maximum protective margin at a reasonable cost.

e.g. In figure above A can be the insulation level (BIL) of the lightning arrestor while B will be the insulation level (BIL) of the transformer. Similarly other devices BILs should be above A.

6 Attempt any <u>FOUR</u> of the following **16**

6a) Draw neat circuit diagram of Buchholz relay.

Ans:



Terminals 'A' : are for alarm and Terminals 'T': are for tripping.

Buchholz relay

Labeled diagram 4 Marks

Partially Labeled diagram 3 Marks

Un-Labeled diagram 2 Marks

6b) Explain negative phase sequence and overheating protection.

Ans:

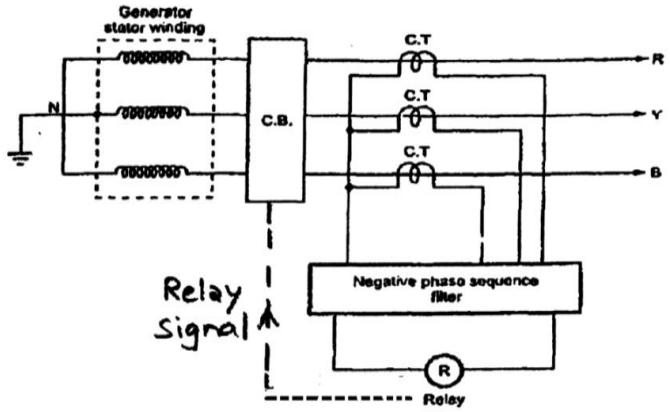
Negative Phase Sequence and Overheating Protection:

Because of unbalance load, negative phase sequence currents are produced and they overheats alternator, the protection against this is provided by negative phase sequence current protection scheme.

Here the CTs, as shown in the diagram, feed the negative phase sequence filter that consists of resistors and inductors so arranged that under normal balanced load conditions, the relay does not operate.

2 Marks for description

But when an appreciable unbalance occurs, the negative phase sequence currents are sensed by the CTs and fed to the negative phase sequence filter, resulting in sufficient current to operate the relay R that trips the circuit breaker CB.



Negative sequence protection

2 Marks for diagram

6c) Explain definite distance relay with neat diagram.

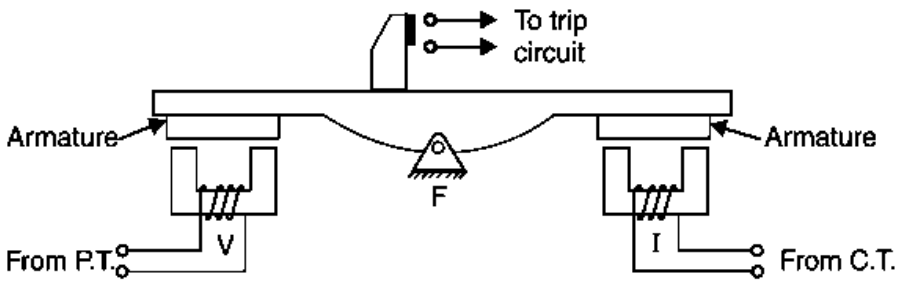
Ans:

Definite Distance Relay:

Figure shows schematic arrangement of definite distance type impedance relay. It consists of a pivoted beam F and two electromagnets energized respectively by a current and voltage transformer in the protected circuit. The beam is provided with a bridging piece for the trip contacts.

2 Marks for description

Under normal operating conditions, the pull due to voltage element is greater than current element. Hence relay contacts remains open**.** Under fault conditions current increases while voltage decreases and the ratio of voltage to current i.e. impedance falls below the predetermined value, ultimately pull from CT side increases, resulting in closing the trip contacts.



2 Marks for diagram

6d) State the requirements of transmission line protection.

Ans:

Requirements of Transmission Line Protection:

i) Faults on lines should be quickly detected to initiate actions to maintain system stability.
ii) For very long lines the protection system must be capable of identifying the fault location.
iii) In the event of short circuit fault on the line, the circuit breaker nearest to it must operate to open the line, while the other circuit breakers remain closed.
iv) Adjacent circuit breakers should provide immediate backup protection in the event of failure of circuit breaker (nearest to fault) to operate.
v) If the line is of prime importance it should have two primary protection schemes working on different principles.

1 Mark for each of any four points = 4 Marks

6e) State the limitations under which differential protection scheme for transformer is used.

Ans:

Limitations of Differential Protection Scheme for Transformer:

1) Due to the magnetization characteristics of the CTs used, the ratio errors change with respect to the circulating currents.
2) The pilot wires used may vary in length due to which the unbalance in the secondary circuit parameter (resistance) is created, which results in improper operation.
3) During heavy short circuit conditions, the high currents create saturation of the flux in core of CTs that lead to abnormal relaying or unexpected behavior of the relaying circuit.
4) Tap changing may lead to change in settings & improper operation.
5) Inrush of magnetizing current may lead to inadvertent operation & hence the settings are done for higher values of fault current (higher imbalance) due to which accuracy of sensing & operation is decreased.

1 mark for each of any 4 limitations = 4 Marks

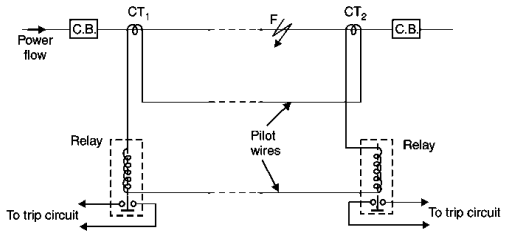
6f) Explain how pilot wire protection is applied to transmission line.

Ans:

Pilot wire protection applied to transmission line:

Figure shows the single line diagram of Merz price voltage balance system for pilot wire protection of three phase transmission line. The pair of CTs in each line is connected in series with a relay in such a way that under normal conditions their secondary voltages are equal and opposite, because current entering is equal to current leaving i.e. they cancel out and no current flowing through relay coil. Suppose a fault occurs at point F, the current entering and leaving are different, now causing current to flow through the relay which trips the circuit breaker for protection of transmission line.

2 Marks for description



2 Marks for diagram