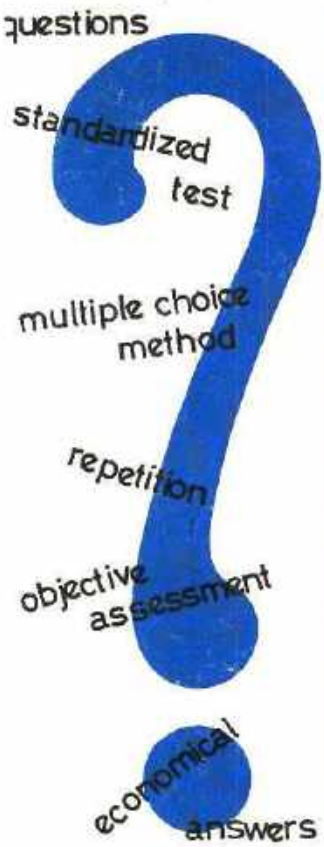

QUESTION BANK

Technical Drawing

electrician

T.T.P Series No. 46

TTP

DEVELOPMENT CELL
FOR SKILLED LABOUR TRAINING
DIRECTORATE OF MANPOWER & TRAINING
GOVERNMENT OF THE PUNJAB
LAHORE

This Question Bank with its sections:

VIEWS, SYMBOLS, INSTALLATION, CIRCUITS, ELECTRICAL MACHINES, MEASURING AND RECTIFIERS

covers all main aspects of technical drawing relevant for trainees in the trade of Electrician.

It provides a multitude of questions to the Trade Test Authorities and to teachers and instructors in Training Centres and undertaking and thus to a great extent relieves them of the time consuming work of again and again finding and compiling new questions for intermediate and final tests.

Throughout this Question Bank multiple-choice questions have been used as only this type of questioning allows for a high degree of objectivity and for a time saving method of checking. Of great importance for the assessment is the fact that only one of the given answers is correct.

For teachers and instructors a major advantage of this Question Bank is that not only can tests be set up in a very short time but that they can also be carried out within minutes (e.g. an intermediate test with 15 different questions on a special topic can be conducted within 20 - 30 minutes).

Thus it is much easier for the teacher to permanently maintain a clear picture of the knowledge of his students. The student himself is able to check his knowledge regularly and the whole series of questions may help him in preparing for the final test as well.

DO NOT WRITE ON THE QUESTION SHEETS

ALWAYS USE A SEPARATE MARKING SHEET

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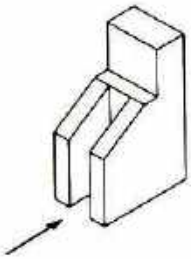
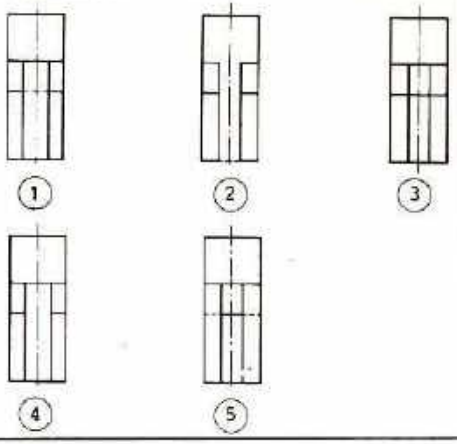
Price: Rs:10.00

V 1.1

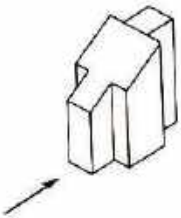
If you look in the direction of the dart, which picture shows the correct view of the workpiece ?

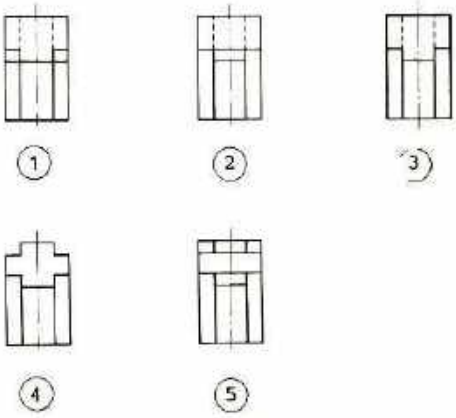




V 1.2

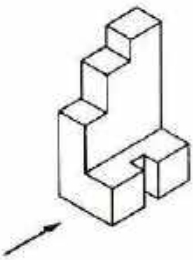
If you look in the direction of the dart, which picture shows the correct view of the workpiece ?

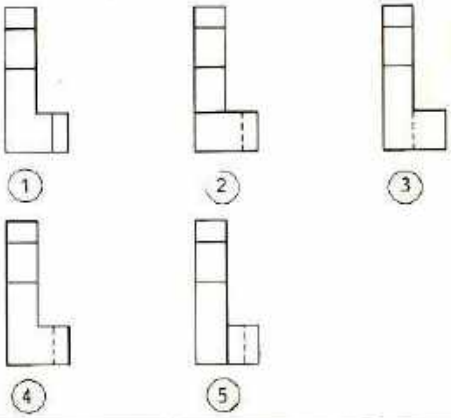




V 1.3

If you look in the direction of the dart, which picture shows the correct view of the workpiece ?





Electr.

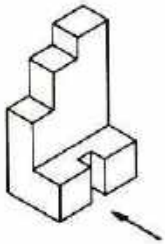
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

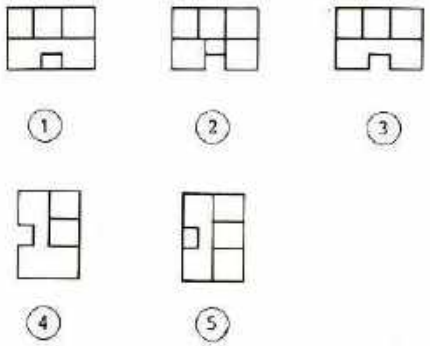
TECHNICAL DRAWING VIEWS 1

V 2.1

Which picture shows the plan view correctly ?

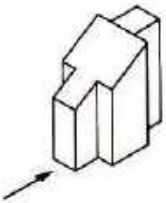


elevation

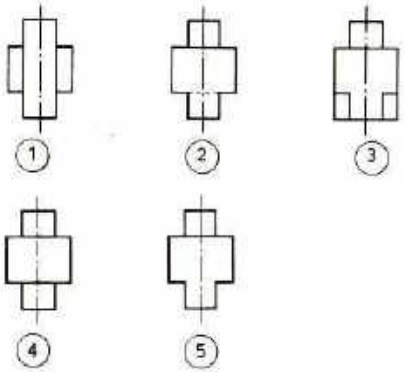


V 2.2

Which picture shows the plan view correctly ?

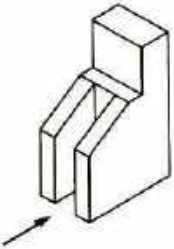


elevation

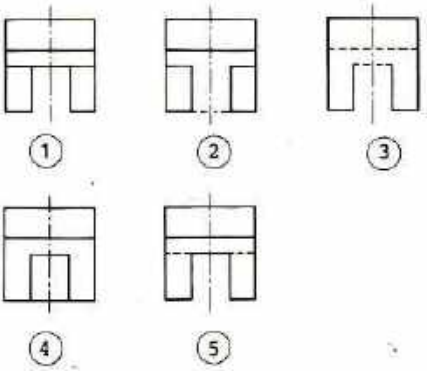


V 2.3

Which picture shows the plan view correctly ?



elevation



Electr.

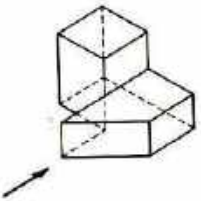
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

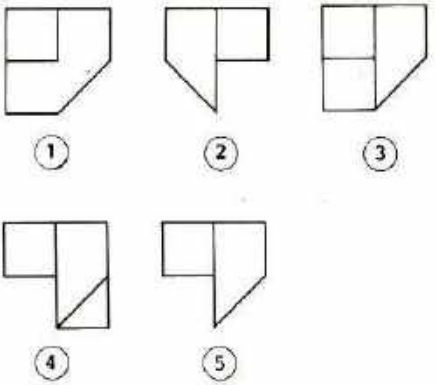
TECHNICAL DRAWING VIEWS 2

v 3.1

Which picture shows the plan view correctly ?

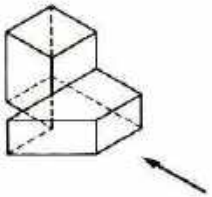


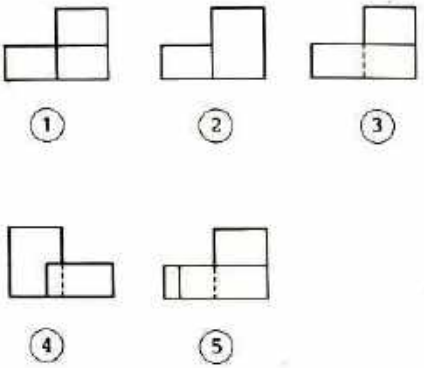
elevation



v 3.2

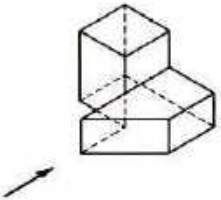
If you look in the direction of the dart, which picture shows the correct view of the workpiece ?

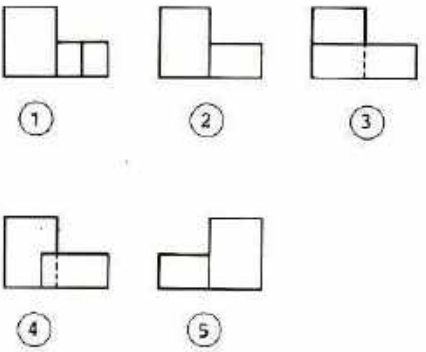




v 3.3

If you look in the direction of the dart, which picture shows the correct view of the workpiece ?

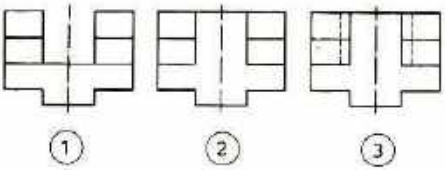


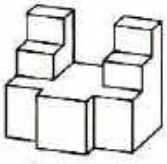


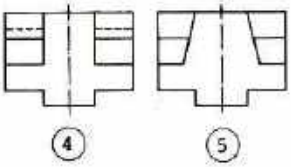
Electr.

v 4.1

Which picture shows the plan view correctly ?



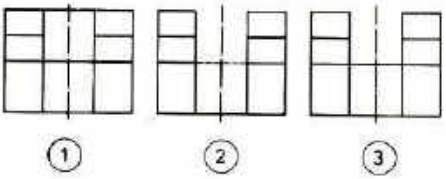


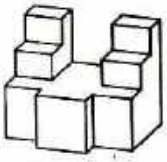


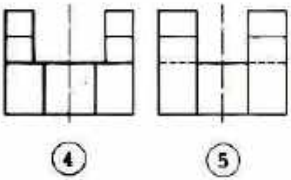
elevation

v 4.2

If you look in the direction of the dart, which picture shows the correct view of the workpiece ?

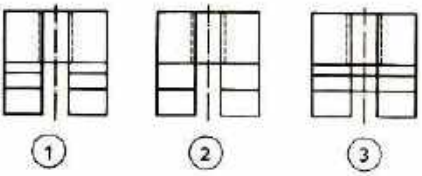


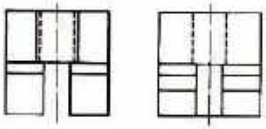




v 4.3

Which picture shows the plan view correctly ?



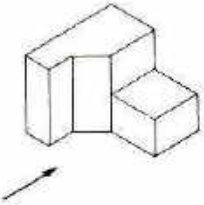


elevation

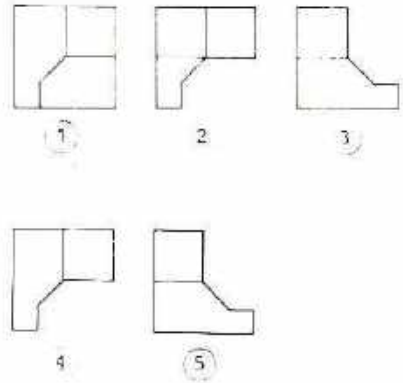
Electr.

V 5.1

Which picture shows the plan view correctly ?

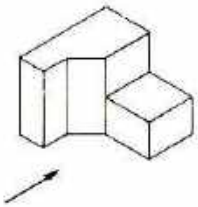


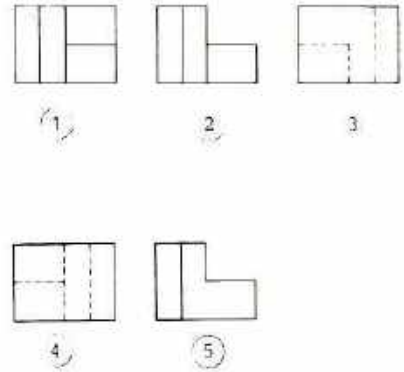
elevation



V 5.2

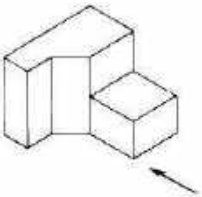
If you look in the direction of the dart, which picture shows the correct view of the workpiece ?

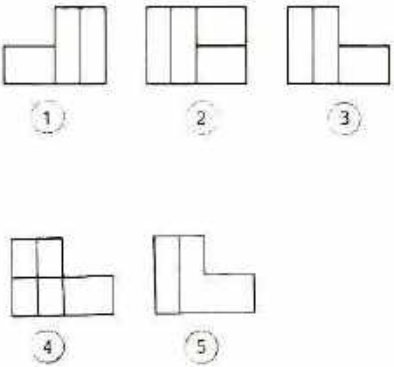




V 5.3

If you look in the direction of the dart, which picture shows the correct view of the workpiece ?





Electr.

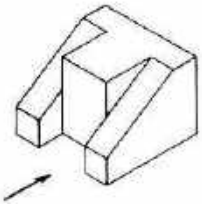
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

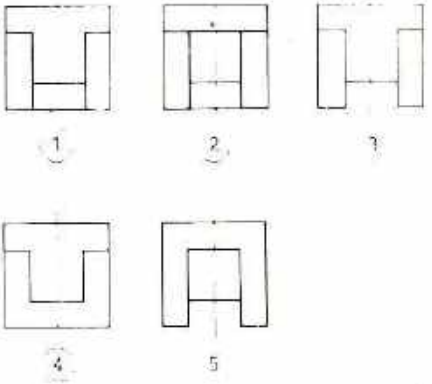
TECHNICAL DRAWING VIEWS

V 6.1

Which picture shows the plan view correctly ?

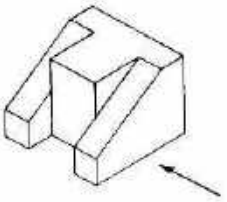


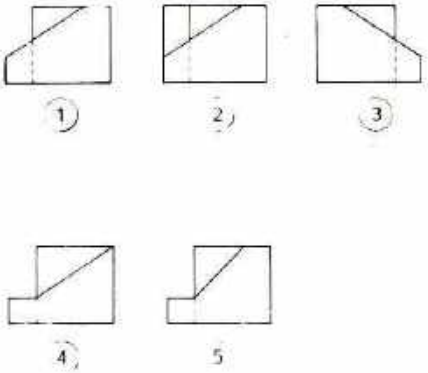
elevation



V 6.2

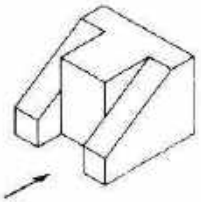
If you look in the direction of the dart, which picture shows the correct view of the workpiece ?

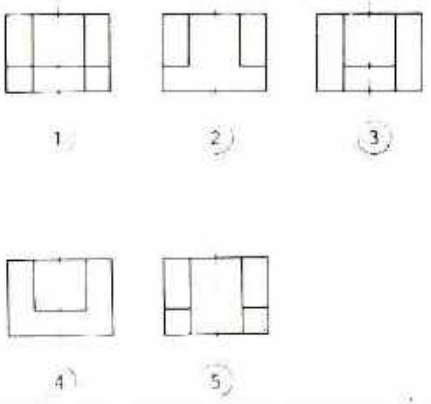




V 6.3

If you look in the direction of the dart, which picture shows the correct view of the workpiece ?

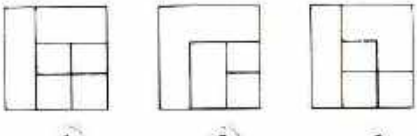




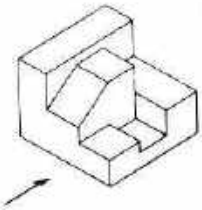
Electr

V 7.1

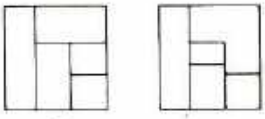
Which picture shows the plan view correctly ?



1 2 3



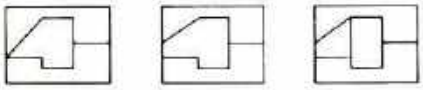
elevation



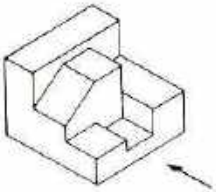
4 5

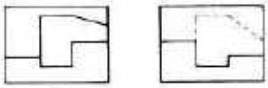
V 7.2

If you look in the direction of the dart, which picture shows the correct view of the workpiece ?



1 2 3

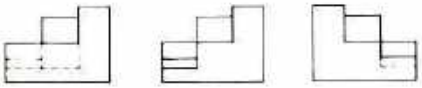




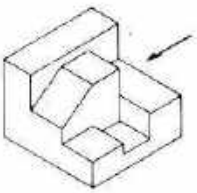
4 5

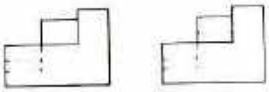
V 7.3

If you look in the direction of the dart, which picture shows the correct view of the workpiece ?



1 2 3





4 5

Electr

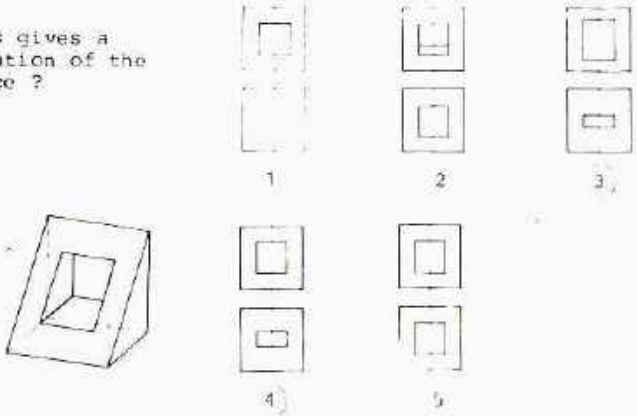
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

TECHNICAL DRAWING VIEWS 7

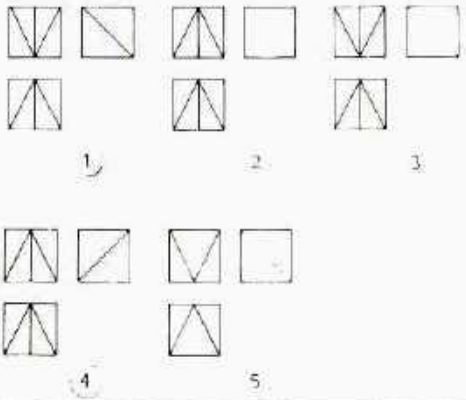
V 8.1

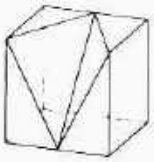
Which set of views gives a correct representation of the prismatic workpiece ?



V 8.2

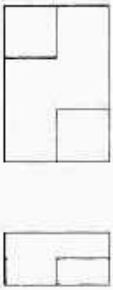
Which set of views gives a correct representation of the prismatic workpiece ?

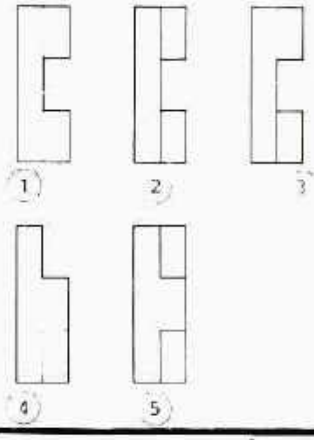




V 8.3

Given: elevation and plan view. Which picture shows the side view correctly ?

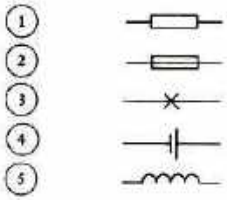




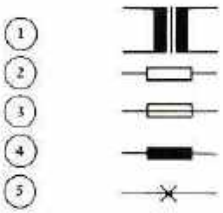
Electr.

S 1.1
S 1.2

Which is the standard symbol for a lamp ?

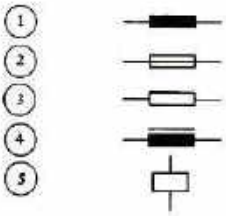


Which is the standard symbol for a fuse ?

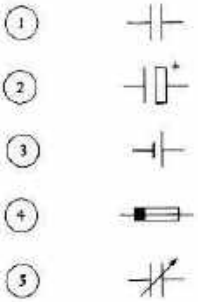


S 1.3
S 1.4

Which is the standard symbol for a resistance ?

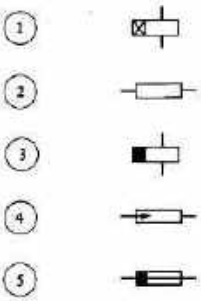


Which is the standard symbol for a battery ?

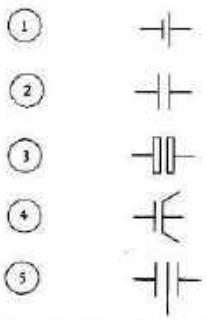


S 1.5
S 1.6

Which is the standard symbol for a fuse with terminal to be connected with the main ?



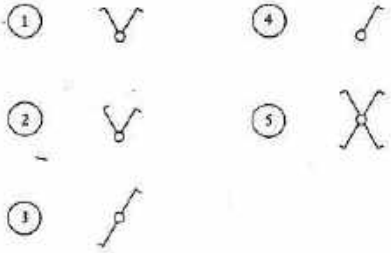
Which is the standard symbol for an unpoled electrolytic capacitor ?



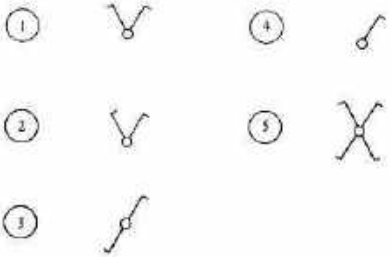
Electr.

S 2.1 S 2.2

Which is the standard symbol for a single pole off switch ?

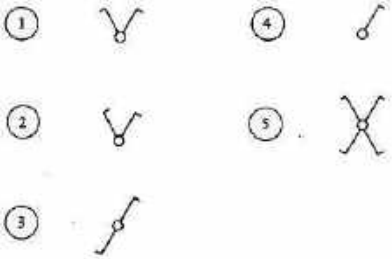


Which is the standard symbol for a change over switch ?



S 2.3 S 2.4

Which is the standard symbol for an intermediate switch ?



What does the shown symbol represent ?

1. Single phase A.C. energy meter
2. Three phase three wire directional energy meter
3. Time counter with synchronous motor
4. D.C. energy meter
5. Three phase four wire reactive power meter

S 2.5 S 2.6

What does the arrow shown in the symbol represent ?

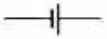
1. Measuring instrument with a general pointer
2. The indication of the instrument is due to vibration
3. Measuring instrument with a digital indication
4. Measuring instrument with low inertia
5. The pointer is deflected in both directions.

What does the shown symbol represent ?

1. Frequency meter
2. Ammeter
3. Voltmeter
4. Synchronoscope
5. Ohmmeter

S 1.1 S 1.2

Which is the standard symbol for a lamp ?

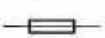
1. 
2. 
3. 
4. 
5. 

Which is the standard symbol for a fuse ?

1. 
2. 
3. 
4.
5. 

S 1.3 S 1.4

Which is the standard symbol for a resistance ?

1. 
2. 
3.
4. 
5. 

Which is the standard symbol for a battery ?

1. 
2. 
3. 
4.
5. 

S 1.5 S 1.6

Which is the standard symbol for a fuse with terminal to be connected with the main ?

1. 
2. 
3. 
4. 
5. 

Which is the standard symbol for an unpoled electrolytic capacitor ?

1. 
2. 
3. 
4. 
5. 

Electr.

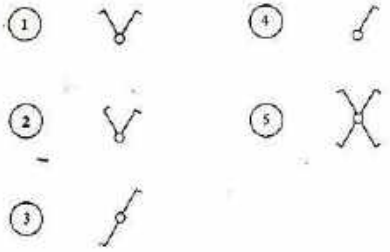
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

FAK-GERMAN TECHNICAL TRAINING PROGRAMME

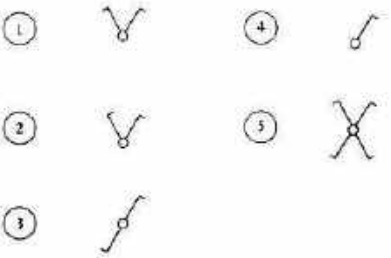
TECHNICAL DRAWING SYMBOLS 1

S 2.1
S 2.2

Which is the standard symbol for a single pole off switch ?

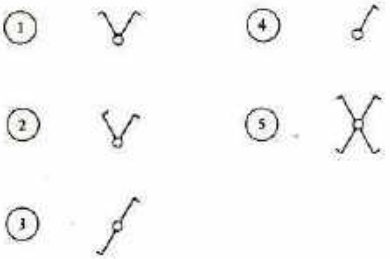


Which is the standard symbol for a change over switch ?



S 2.3
S 2.4

Which is the standard symbol for an intermediate switch ?



What does the shown symbol represent ?

1. Single phase A.C. energy meter
2. Three phase three wire directional energy meter
3. Time counter with synchronous motor
4. D.C. energy meter
5. Three phase four wire reactive power meter

S 2.5
S 2.6

What does the arrow shown in the symbol represent ?

1. Measuring instrument with a general pointer
2. The indication of the instrument is due to vibration
3. Measuring instrument with a digital indication
4. Measuring instrument with low inertia
5. The pointer is deflected in both directions.

What does the shown symbol represent ?

1. Frequency meter
2. Ammeter
3. Voltmeter
4. Synchronoscope
5. Ohmmeter

Electr.

S 3.1 S 3.2

Which circuit element is represented by the shown symbol ?

1. A battery
2. A poled capacitor
3. Plug and socket with protective conductor
4. A diode
5. A poled electrolytic capacitor

Which circuit element is represented by the shown symbol ?

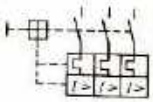
1. A fuse
2. A resitor with tapping
3. A three winding relay
4. A series terminal
5. An automatic cut out switch

S 3.3 S 3.4

Which symbol represents "earth" ?

1. 
2. 
3. 
4. 
5. 

Which circuit element is represented by the shown symbol ?



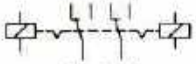
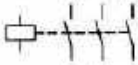
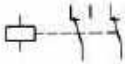
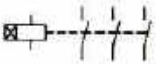
1. A hand operated three phase power switch with an electromechanical lock
2. A motor protection switch
3. An electrothermal over current relay
4. A three pole over voltage relay
5. A three pole under voltage relay

S 3.5 S 3.6

Which is the standard symbol for a coil with a core ?

1. 
2. 
3. 
4. 
5. 

Which of the shown symbols represents a contactor with three make contacts ?

1. 
2. 
3. 
4. 
5. 

Electr.

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TECHNICAL DRAWING SYMBOLS 3

S 4.1 S 4.2

Which is the standard symbol for an overvoltage relay ? .

1. 
2. 
3. 
4. 
5. 

What does the shown symbol represent ? 

1. Step down transformer
2. Stove
3. Heater
4. Fan
5. Air conditioner

S 4.3 S 4.4

Which of the following lines is used for earthing ?

1.
2.
3.
4.
5.

Which is the standard symbol for a single phase A.C. energy meter ?

1. 
2. 
3. 
4. 
5. 

S 4.5 S 4.6

What does the shown symbol represent ? 

1. **A single phase A.C. energy meter**
2. **A three phase energy meter**
3. **A time relay with synchronous motor**
4. **A D.C. energy meter**
5. **A three phase reactive energy meter**

What does the shown symbol represent ? 

1. Voltage transformer
2. Choke
3. Step down transformer
4. Autotransformer
5. Current transformer

S 3.1 S 3.2

Which circuit element is represented by the shown symbol ?

1. A battery
2. A poled capacitor
3. Plug and socket with protective conductor
4. A diode
5. A poled electrolytic capacitor

Which circuit element is represented by the shown symbol ?

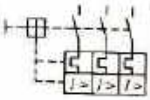
1. A fuse
2. A resitor with tapping
3. A three winding relay
4. A series terminal
5. An automatic cut out switch

S 3.3 S 3.4

Which symbol represents "earth" ?

1. 
2. 
3. 
4. 
5. 

Which circuit element is represented by the shown symbol ?



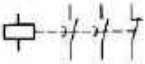
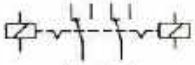
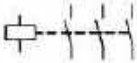
1. A hand operated three phase power switch with an electromechanical lock
2. A motor protection switch
3. An electrothermal over current relay
4. A three pole over voltage relay
5. A three pole under voltage relay

S 3.5 S 3.6

Which is the standard symbol for a coil with a core ?

1. 
2. 
3. 
4. 
5. 

Which of the shown symbols represents a contactor with three make contacts ?

1. 
2. 
3. 
4. 
5. 

Electr.

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TECHNICAL DRAWING SYMBOLS 3

S 4.1
S 4.2

Which is the standard symbol for an overvoltage relay ?

1. 

2. 

3. 

4. 

5. 

What does the shown symbol represent ?

1. Step down transformer
2. Stove
3. Heater
4. Fan
5. Air conditioner

S 4.3
S 4.4

Which of the following lines is used for earthing ?

1.
2.
3.
4.
5.

Which is the standard symbol for a single phase A.C. energy meter ?

1. 

2. 

3. 

4. 

5. 

S 4.5
S 4.6

What does the shown symbol represent ?

1. A single phase A.C. energy meter
2. A three phase energy meter
3. A time relay with synchronous motor
4. A D.C. energy meter
5. A three phase reactive energy meter

What does the shown symbol represent ?

1. Voltage transformer
2. Choke
3. Step down transformer
4. Autotransformer
5. Current transformer

S 5.1 S 5.2

Which machine is represented by the shown symbol ?

1. D.C. series motor
2. D.C. shunt motor
3. D.C. shunt motor with commutating pole winding
4. D.C. series motor with commutating pole winding
5. D.C. shunt generator

Which machine is represented by the shown symbol ?

1. D.C. shunt generator
2. D.C. series generator
3. Separately excited D.C. shunt generator
4. D.C. compound generator
5. Self excited D.C. series generator

S 5.3 S 5.4

Which motor is represented by the shown symbol ?

1. A squirrel cage motor without starting winding
2. A squirrel cage motor with starting winding on the stator
3. A squirrel cage motor with star-delta winding
4. A squirrel cage motor with two separate windings for pole changing (from 8 to 4 poles)
5. A squirrel cage motor with Dahlander pole changing circuit (two speed).

Which motor is represented by the shown symbol ?

1. A three phase slipring motor running as a two phase motor with star connected stator winding
2. A squirrel cage A.C. motor with star connected stator winding
3. A salient pole three phase motor with cage starter, stator winding star connected
4. A three phase motor with cage rotor and delta connected stator
5. A squirrel cage motor with inductively coupled short circuit starter winding on the stator

S 5.5 S 5.6

Which is the standard symbol for a three phase motor ?

1. 

2. 

3. 

4. 

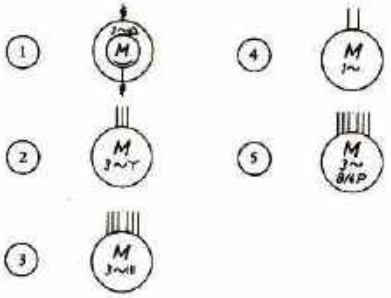
5. 

What does the shown symbol represent ?

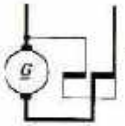
1. Current transformer
2. Transformer
3. Rectifier
4. Choke
5. Auto transformer

S 6.1
S 6.2

Which of the shown symbols represents a cage rotor motor with star connected stator winding ?



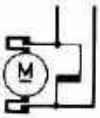
Which machine is represented by the shown symbol ?



1. Separately excited series generator
2. Separately excited series motor
3. Compound generator with series field winding
4. Compound motor with series field winding
5. Motor with commutating pole winding, one side connected with the armature

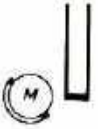
S 6.3
S 6.4

Which machine is represented by the shown symbol ?



1. D.C. series motor with commutating pole winding, one side connected with the armature
2. D.C. shunt motor with commutating pole winding, one side connected with the armature
3. D.C. shunt motor with compensating-commutating pole winding, one side connected with the armature
4. D.C. shunt motor with symmetrically distributed commutating winding
5. D.C. series motor with symmetrically distributed commutating winding

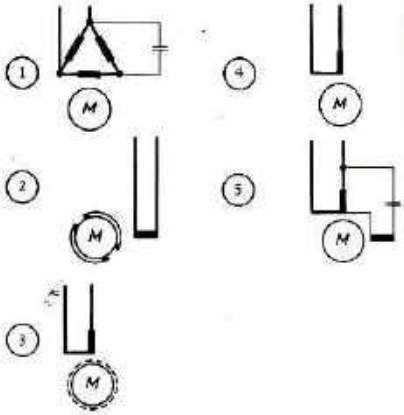
Which machine is represented by the shown symbol ?



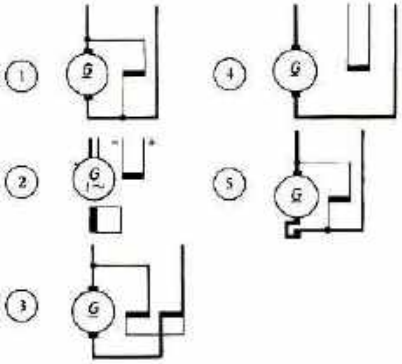
1. Repulsion motor with one set of brushes
2. Single phase commutator series motor
3. Repulsion motor with two sets of brushes
4. Single phase commutator series motor with commutating pole- and compensating winding
5. Single phase synchronous generator with salient poles on the stator

S 7.1
S 7.2

Which of the shown symbols represents the single phase squirrel cage motor with starter winding on the stator ?



Which of the shown symbols represents the separately excited D.C. generator ?



S 7.3
S 7.4

What does the shown symbol represent ?

1. Voltage-operated earth-leakage circuit breaker
2. Auto transformer
3. Single phase transformer
4. Voltage transformer
5. Current transformer

What does the shown symbol represent ?

1. Voltage transformer
2. Single phase transformer
3. Magnetic amplifier
4. Current transformer
5. Current-operated earth-leakage circuit-breaker.

I 1.1

Which of the statements is true for the circuit shown ?

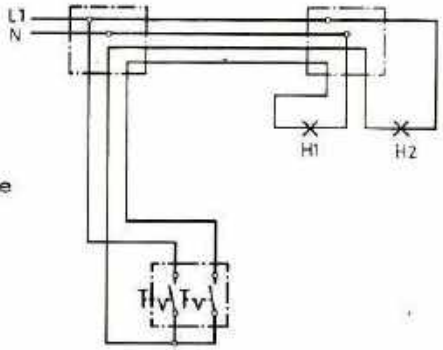
(1) The circuit represents a group switch.

(2) When both the contacts of the switch are closed the lamp H1 glows.

(3) If only the right contact of the switch is closed none of the lamps glows.

(4) If only the left contact of the switch is closed the lamp H2 glows.

(5) If only the right contact of the switch is closed the lamp H1 glows.



I 1.2

Which of the statements is true for the circuit shown ?

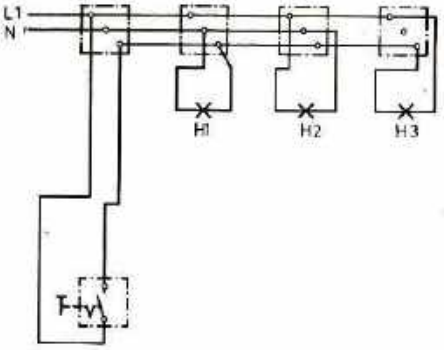
(1) The circuit represents a series connection.

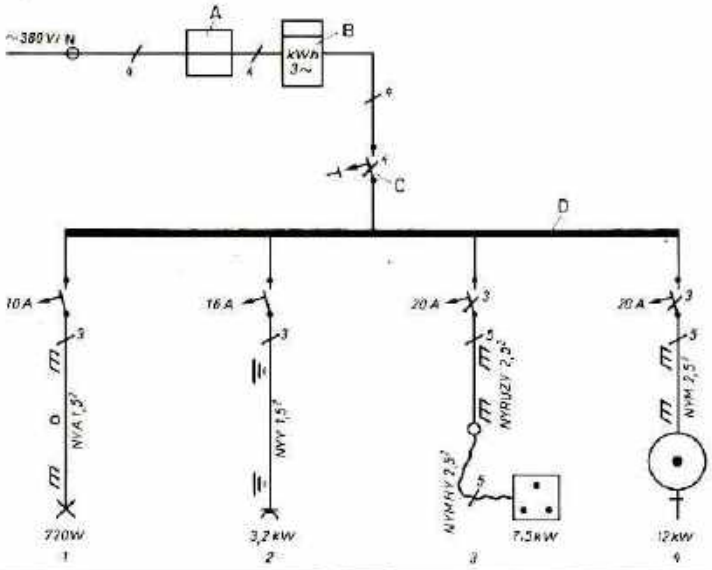
(2) The circuit represents a group connection.

(3) All the lamps are off in the shown state.

(4) The lamp H3 glows constantly, the lamp H1 cannot be switched on.

(5) The lamp H2 glows constantly, the lamp H3 cannot be switched on.





I 2.1
I 2.2

What can the above circuit plan be termed as ?

(1) Structural plan
(2) Installation layout diagram
(3) Wiring diagram
(4) Complete circuit diagram
(5) Current path diagram

What is represented by the symbol marked B ?

(1) Energy meter
(2) A.C. meter
(3) Distribution board
(4) Service main
(5) Three phase energy meter

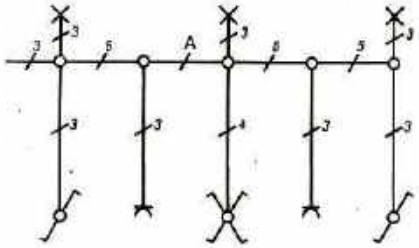
I 2.3
I 2.4

What is represented by the symbol marked C ?

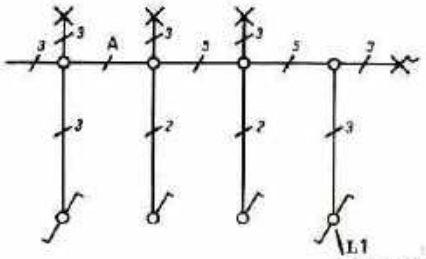
(1) Motor protective switch
(2) Automatic cutout
(3) Current operated earth leakage circuit breaker
(4) Under voltage protection switch
(5) Voltage operated earth leakage circuit breaker

What is represented by the symbol marked A ?

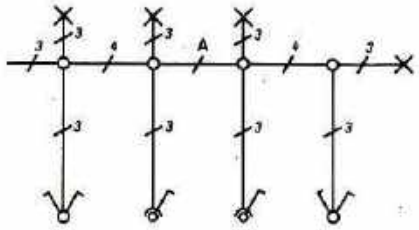
(1) Terminal box
(2) Distribution
(3) Cable bushing
(4) Main junction box
(5) Meter board



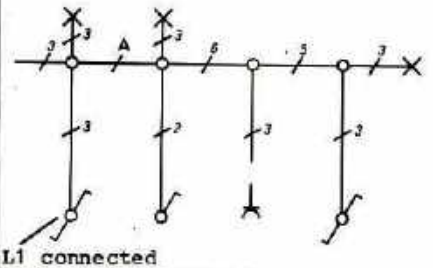
layout 1



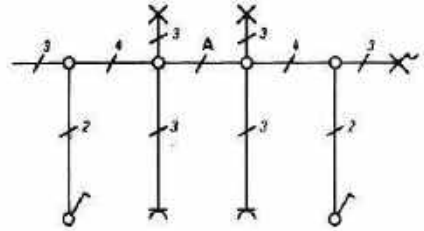
layout 2



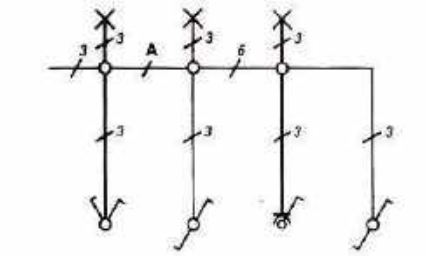
layout 3



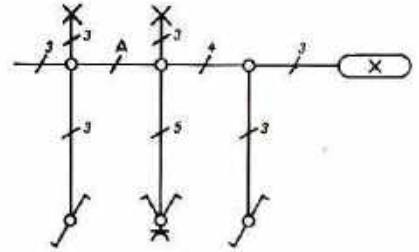
layout 4



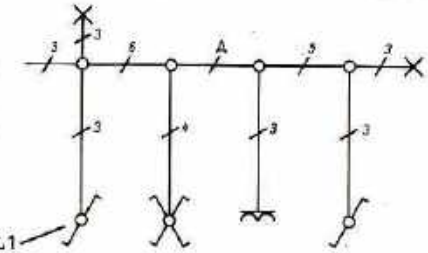
layout 5



layout 6



layout 7



layout 8

Electr.

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TECHNICAL DRAWING INSTALLAT 3

I 3/1.1

One has to carry out the following installation work:
2 single pole circuits,
2 safety sockets,
1 lamp with switch included.
Which of the layouts shown at the preceding page is the correct one ?

(1) layout 1
(2) layout 2
(3) layout 3
(4) layout 4
(5) layout 5

I 3/1.2

One has to carry out the following installation work:
1 multicircuit,
1 change over circuit,
1 safety socket with switch.
Which of the layouts shown at the preceding page is the correct one ?

(1) layout 2
(2) layout 3
(3) layout 4
(4) layout 6
(5) layout 7

I 3/1.3

One has to carry out the following installation work:
1 change over circuit,
2 single pole circuits,
1 lamp with switch included.
Which of the layouts shown at the preceding page is the correct one ?

(1) layout 1
(2) layout 2
(3) layout 3
(4) layout 6
(5) layout 7

I 3/1.4

One has to carry out the following installation work:
1 intermediate circuit,
2 safety sockets.
Which of the layouts shown at the preceding page is the correct one ?

(1) layout 1
(2) layout 2
(3) layout 6
(4) layout 7
(5) layout 8

I 3/1.5

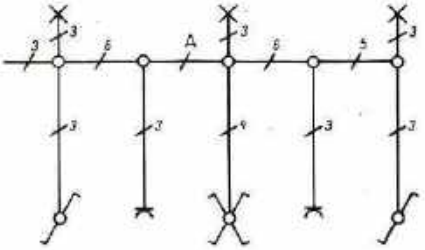
Layout 1:
How many wires must be in cable A ?

(1) 2 wires
(2) 3 wires
(3) 4 wires
(4) 5 wires
(5) 6 wires

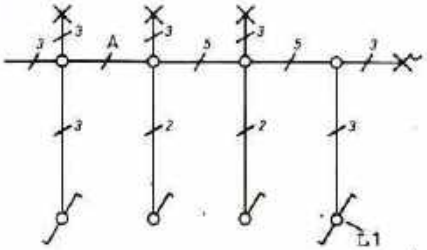
I 3/1.6

Layout 4:
How many wires must be in cable A when the single pole switch operates the left lamp?

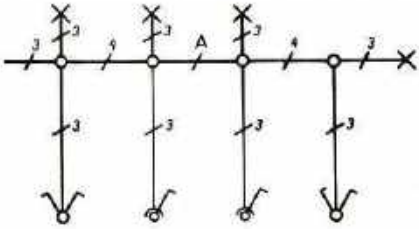
(1) 2 wires
(2) 3 wires
(3) 4 wires
(4) 5 wires
(5) 6 wires



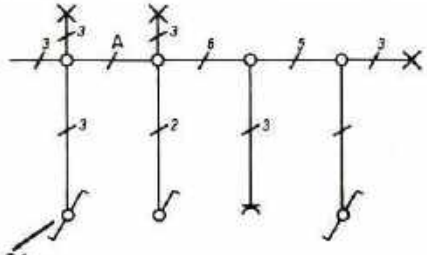
layout 1



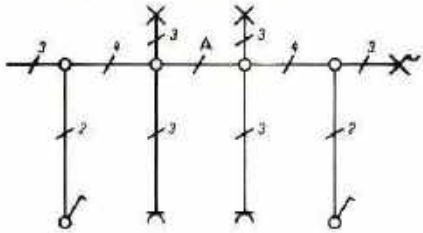
layout 2



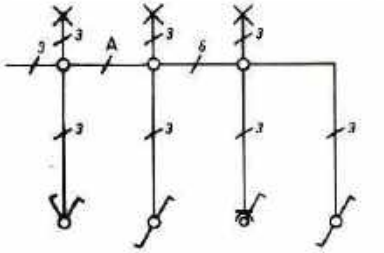
layout 3



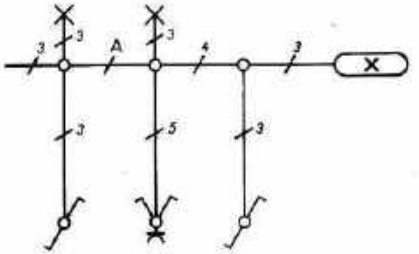
layout 4



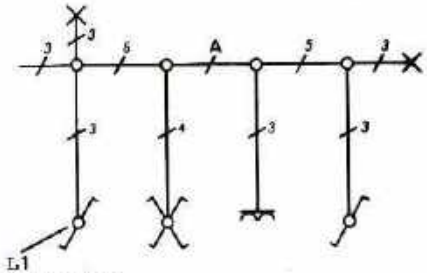
layout 5



layout 6



layout 7



layout 8

Electr.

DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

TECHNICAL DRAWING INSTALLAT. 4

I 4/1.1 I 4/1.2

Layout 5:
How many wires must be in cable A when the left single pole switch operates the left lamp ?

(1) 2 wires
(2) 3 wires
(3) 4 wires
(4) 5 wires
(5) 6 wires

Layout 6:
How many wires must be in cable A when the change over switch operates the left lamp only ?

(1) 3 wires
(2) 4 wires
(3) 5 wires
(4) 6 wires
(5) 8 wires

I 4/1.3 I 4/1.4

Layout 7:
How many wires must be in cable A when the change over switch operates the discharge lamp ?

(1) 3 wires
(2) 4 wires
(3) 5 wires
(4) 6 wires
(5) 7 wires

Layout 8:
How many wires must be in cable A ?

(1) 2 wires
(2) 3 wires
(3) 4 wires
(4) 5 wires
(5) 6 wires

I 4/1.5 I 4/1.6

One has to carry out the following installation work:
1 change over circuit,
1 single pole circuit,
1 safety socket.
Which of the layouts shown at the preceding page is the correct one ?

(1) layout 1
(2) layout 2
(3) layout 3
(4) layout 4
(5) layout 5

One has to carry out the following installation work:
1 multi circuit,
1 change over circuit
1 safety socket.
Which of the layouts shown at the preceding page is the correct one ?

(1) layout 2
(2) layout 3
(3) layout 4
(4) layout 6
(5) layout 7

I 5.1

Which installation circuit is represented by the figure ?

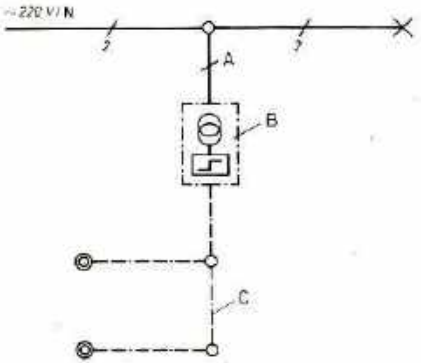
(1) An automatic stair case circuit.

(2) An electric bell installation.

(3) A warning system.

(4) A lamp circuit with impulsing switch.

(5) A calling system with indicating lamp.



I 5.2
I 5.3

Which of the following statements is true for line C shown in the circuit of the figure ?

(1) It represents a mechanical connection between the circuit elements.

(2) It represents a signal line.

(3) It represents a protective conductor.

(4) It represents an empty conduit.

(5) It represents a telephone cable.

Which of the following statements is true for the symbol denoted by B ?

(1) A transformer with bridge rectifier.

(2) A frequency converter.

(3) An impulsing switch with low excitation voltage.

(4) A time relay for domestic stair case.

(5) A flasher relay with low excitation voltage.

I 5.4
I 5.5

How many wires must be in cable A of the circuit shown in the figure ?

(1) 2 wires

(2) 3 wires

(3) 4 wires

(4) 5 wires

(5) 6 wires

Which of the following circuits could replace the circuit shown in the figure in such a way that the same function is fulfilled ?

(1) A two pole breaking circuit

(2) A series circuit

(3) A group circuit

(4) A change over circuit

(5) Two breaking circuits

I 6.1

Which of the statements shows the mistake in the wiring diagram ?

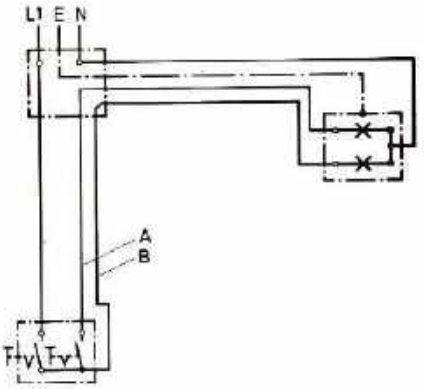
(1) Phase L1 is connected wrongly.

(2) The symbol of the switch is wrong.

(3) The conductors A and B are changed by mistake.

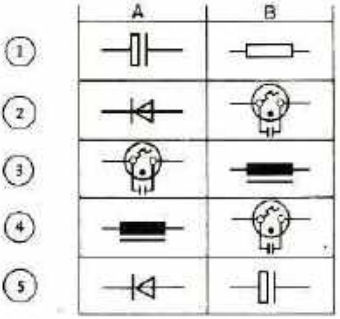
(4) The earth conductor is connected wrongly.

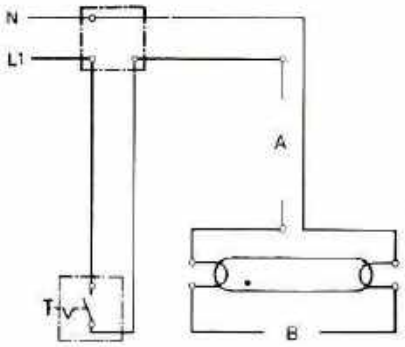
(5) Phase L1 and N should be interchanged in the junction box.



I 6.2

The shown circuit is to be completed.
Which of the answers gives the correct symbols for A and B ?





I 7.1

In the shown circuit the electric bell H1 is to be rung by push button b2 and bell H2 by push button b1.
How should the terminals 1 to 6 be connected ?

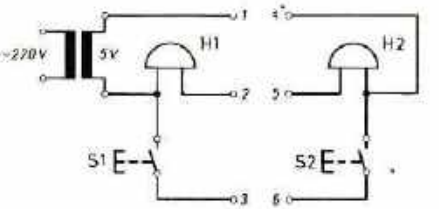
(1) 1 with 4, 2 with 5, 3 with 6

(2) 1 with 5, 2 with 6, 3 with 4

(3) 1 with 4, 2 with 6, 3 with 5

(4) 1 with 6, 2 with 5, 3 with 4

(5) 1 with 5, 2 with 6, 3 with 4



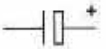
I 7.2

The shown lead-lag circuit is to be completed.

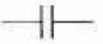
Which of the symbols is to be shown between the terminals 1 and 2 ?

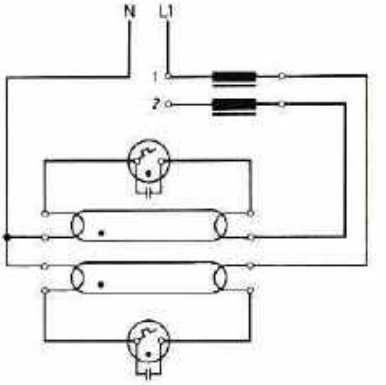
(1)


(2)


(3)


(4)


(5)




I 8.1

What does the shown circuit represent ?

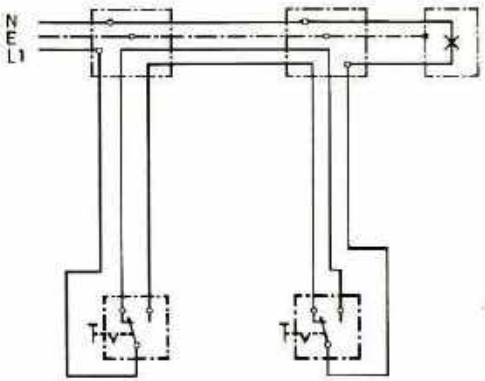
(1) A change over circuit

(2) A two pole breaking circuit

(3) A series circuit

(4) A group circuit

(5) An intermediate circuit



I 8.2

The change over circuit shown in the diagram has an important mistake. Which of the following statements is correct ?

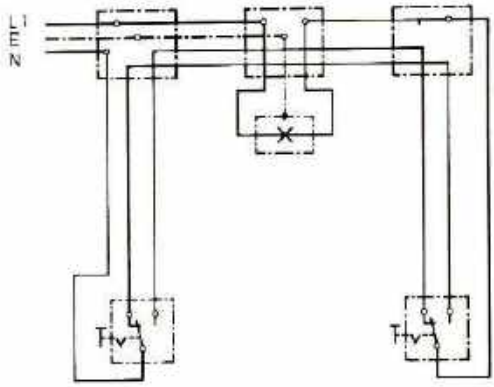
(1) Wrong wires are connected with both the switches.

(2) The protective conductor should not be connected with the lamp.

(3) The neutral conductor is not connected with the protective conductor in the left junction box.

(4) The lamp wire is connected wrongly with the right switch.

(5) The neutral conductor 'N' and the live conductor 'L1' have been interchanged in the left junction box.



I 9.1

Why would the shown circuit not function properly ?

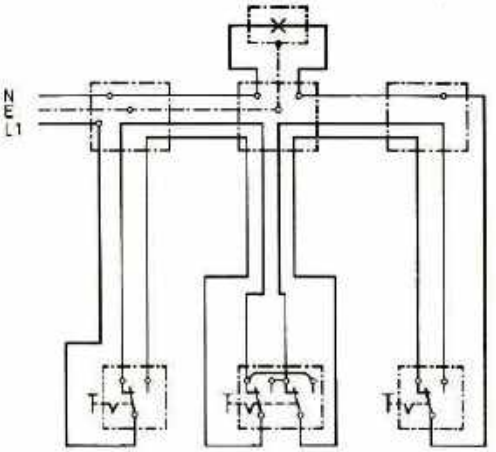
(1) Because the switch in centre is not an intermediate switch.

(2) Because the switch in centre is connected wrongly.

(3) Because the outer switches are group switches.

(4) Because the wires corresponding to both the outer switches have been connected wrongly.

(5) Because the lamp wire is connected wrongly with the right switch.



I 9.2

Which statement about the shown circuit is true ?

The contactor is switched 'ON' when:

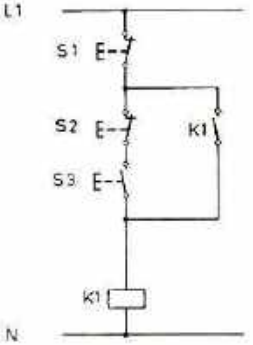
(1) push button S2 and S3 are pressed simultaneously.

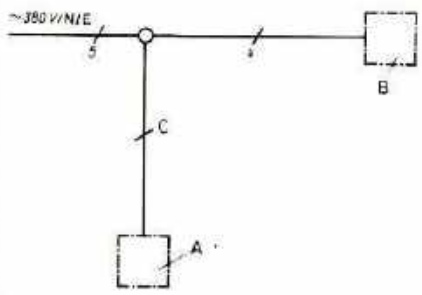
(2) push button S3 is pressed.

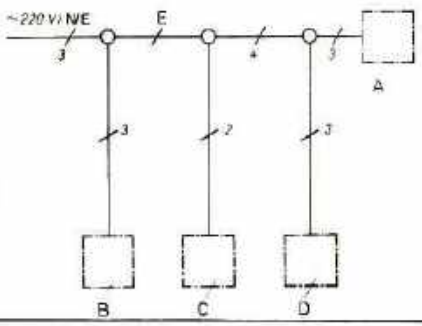
(3) push button S2 is pressed.

(4) push button S1 and S3 are pressed simultaneously.

(5) push button S1 and S2 are pressed simultaneously.

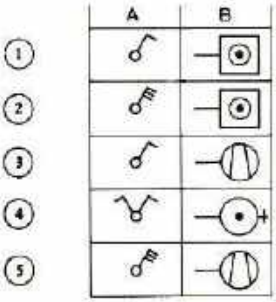




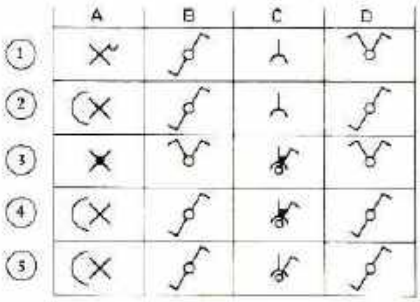


I 10.1
I 10.2

A three phase exhaust fan is to be switched ON and OFF by means of a switch. The above circuit is to be completed for this function. Which answer gives the correct symbols for A and B ?



A flood light A is to be switched ON and OFF from points B and D in the above circuit. An interlocking socket is to be placed at C. Which answer gives the correct symbols for A to D ?



I 10.3
I 10.4

How many wires must be in cable C when a three phase exhaust fan is to be connected in the above circuit ?

(1) 3 wires
(2) 4 wires
(3) 5 wires
(4) 6 wires
(5) 8 wires

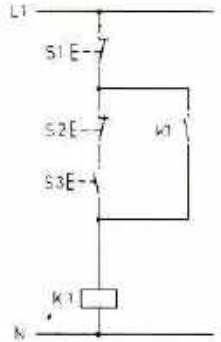
A flood light A is to be switched ON and OFF from points B and D in the above circuit. An interlocking socket is to be placed at C. How many wires must be in cable E ?

(1) 3 wires
(2) 4 wires
(3) 5 wires
(4) 6 wires
(5) 7 wires

C 1.1

Which statement about the shown circuit is true ?
The contactor is switched ON when:

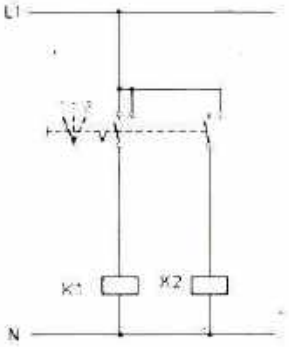
1. the push buttons S1 and S2 are pressed simultaneously.
2. the push button S3 is pressed.
3. the push button S1 is pressed.
4. the push buttons S2 and S3 are pressed simultaneously.
5. the push buttons S1 and S3 are pressed simultaneously.



C 1.2

Which statement about the current path diagram is true ?

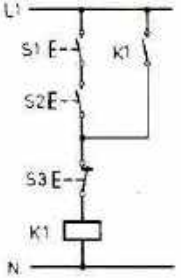
1. Switch position 1 would energize only contactor K2.
2. Switch position 1 would energize contactors K1 and K2.
3. Switch position 2 would energize only the contactor K1.
4. Switch position 2 would energize only the contactor K2.
5. Switch position 2 would energize contactors K1 and K2.



C 1.3

The current path diagram of a circuit is shown in the figure.
Which statement is true ?

1. Contactor K1 remains energized as long as S1 or S2 is pressed.
2. K1 is energized and is self holding when S1 or S2 is pressed.
3. K1 remains energized as long as S1 and S2 are pressed.
4. K1 is energized and remains energized when S1 and S2 are pressed.
5. K1 is energized and remains energized when S1, S2 and S3 are pressed simultaneously.



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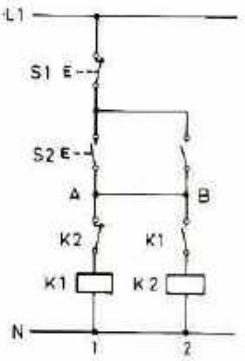
C 2.1

What changes are necessary in the shown circuit to keep contactors K1 and K2 energized after operating S2 ?



(1) Normally closed contact K2 in current path 1 should be removed.

(2) A normally open contact of contactor K1 should be connected parallel with S1.

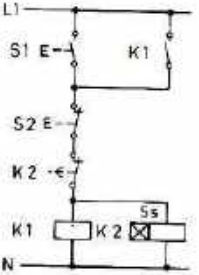
(3) Contactor K1 should have a delayed action.

(4) Contactor K2 should have a delayed action.

(5) There should be no connection between terminals A and B.

C 2.2

The current path diagram of a circuit is shown in the figure. Which statement about it is true ?



(1) 5 seconds after pressing S1 the contactor K1 operates and remains energized.

(2) After pressing S1 the contactor K1 operates immediately and drops out after 5 seconds.

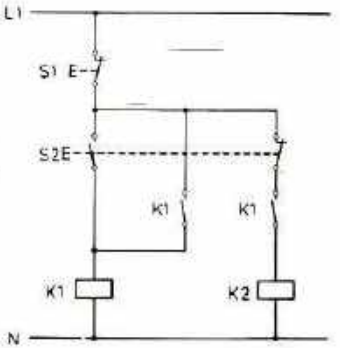
(3) When S1 is pressed for 5 seconds the contactor K1 operates and remains energized.

(4) If S1 is pressed for 5 seconds the contactor K1 drops out immediately after releasing S1.

(5) When S1 is pressed the contactor K1 operates. When now S2 is pressed the contactor K1 drops out after 5 seconds.

C 3.1

Which statement about the circuit is true ?



(1) When S2 is pressed contactor K1 is energized. When S2 is released contactor K2 is also energized.

(2) When S2 is pressed contactor K1 is energized. When S2 is released contactor K2 is energized and contactor K1 switches OFF.

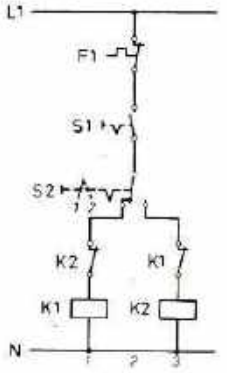
(3) When S2 is pressed both the contactors are energized but switch OFF after S2 is released.

(4) When S2 is pressed both the contactors are energized and remain energized after S2 is released.

(5) When S2 is pressed contactor K2 is energized first and contactor K1 is energized only after S2 is released.

C 3.2

Which of the statements is true for the normally closed contact K1 in current path 3 ?



(1) It has no function in the circuit.

(2) It is connected in the circuit so that the resistance of the contactor coil can be checked.

(3) It prevents the switching ON of the contactor K2 when the armature of the contactor K1 is still pulled.

(4) While the position of S2 is being changed it should prevent damaging of the contacts of S2 due to the arc.

(5) It serves to keep the contactor K1 in self holding position.

C 4.1

Which of the statements is true for the shown circuit ?

By switching ON S1 the lamp H1 would:

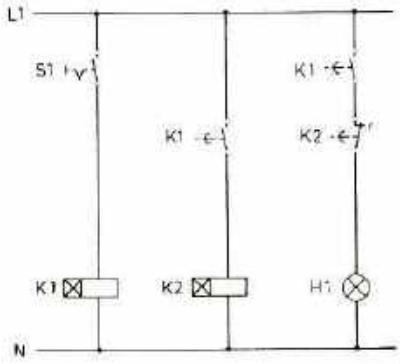
(1) glow after the delay time adjusted on time relay K1 and switch OFF after the delay time adjusted on time relay K2.

(2) glow after the delay time adjusted on time relay K2 and switch OFF after the delay time adjusted on time relay K1.

(3) glow after the expiry of the delay times adjusted on time relays K1 and K2.

(4) immediately glow till S1 is switched OFF.

(5) immediately glow and switch OFF after the expiry of the delay time adjusted on time relay K1.



C 4.2

What happens when S1 is switched ON ?

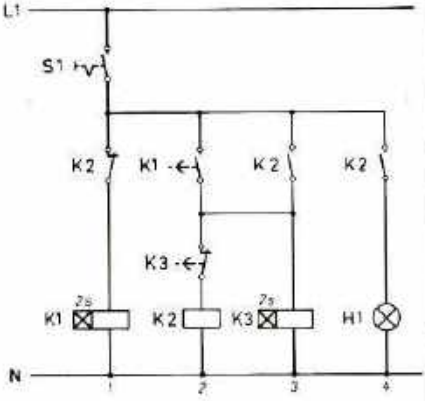
(1) H1 glows after 2 seconds and goes out after 2 seconds without glowing again.

(2) H1 glows after 2 seconds and goes out 2 seconds after S1 is switched OFF.

(3) H1 starts blinking after 2 seconds and remains ON and OFF each for 2 seconds.

(4) H1 starts blinking immediately and remains ON and OFF each for 2 seconds.

(5) H1 starts blinking immediately and remains ON and OFF each for 1 second.



C 5.1

The figure shows a circuit of an alarm system. In which case is the alarm not given ?

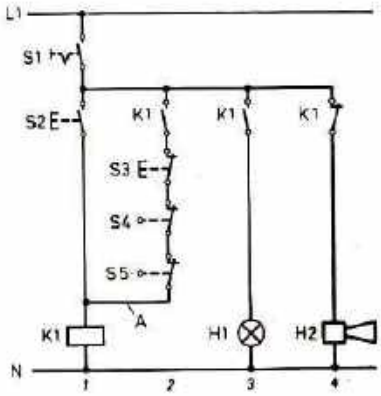
(1) When S1 is switched ON.

(2) When S1 is switched ON and S2 operated.

(3) When S1 is switched ON and after pressing and releasing S2 push button S3 is pressed.

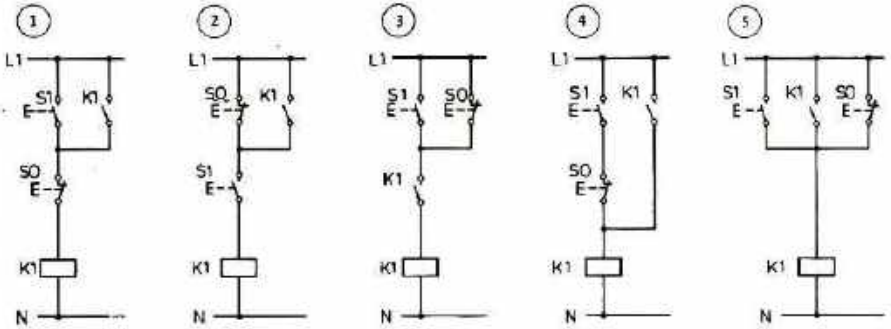
(4) When S1 is switched ON and after pressing and releasing S2 push button S4 is pressed.

(5) When S1 is switched ON and after pressing and releasing S2 push buttons S3 and S4 are pressed.



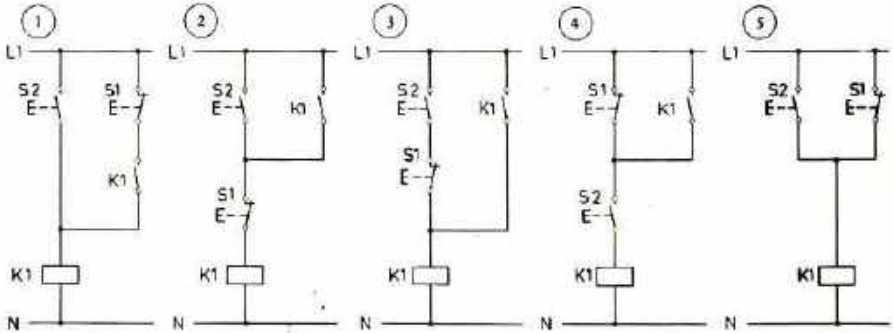
C 5.2

A wiring has to perform the following functions:
When a push button is pressed, a contactor is energized.
After releasing the push button the contactor remains energized till a second push button is pressed.
Which of the circuit diagrams shows this function ?



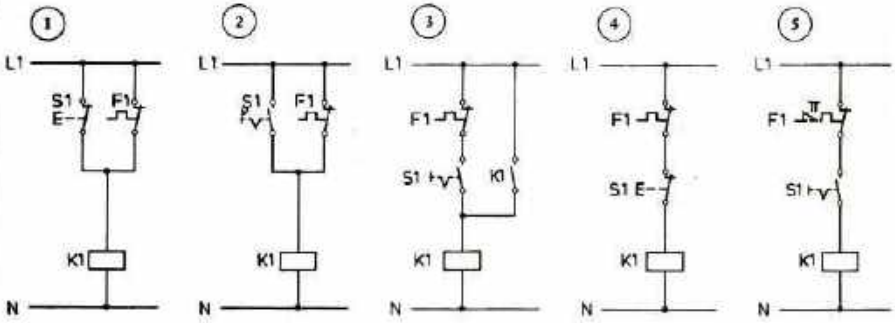
C 6.1

A wiring has to perform the following function:
By pressing the ON button S2 for a short time the contactor K1 is energized and remains so till button S1 is pressed.
When S1 and S2 are pressed simultaneously the contactor is also energized.
Which of the circuit diagrams shows the function ?



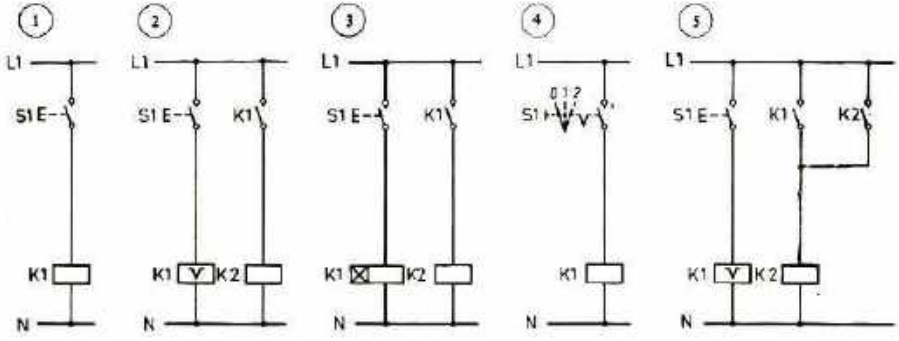
C 6.2

A circuit has to perform the following function:
A contactor K1 is switched ON and OFF by a switch. The circuit controlled by the contactor is protected by an electro thermal over current relay. When this relay operates the contactor drops out.
Which of the following circuits performs this function ?



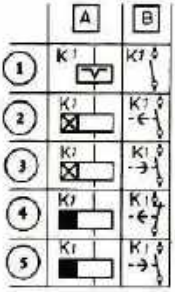
C 7.1

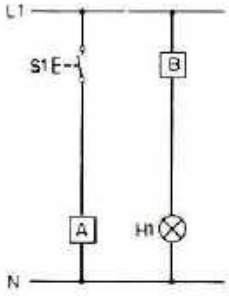
A circuit has to perform the following function:
By pressing a push button a contactor operates and remains so till the push button is pressed again.
Which of the following circuits performs this function ?



C 7.2

The circuit shown in the figure should perform the following function:
After operating S1 the indicator lamp H1 glows for some time and then automatically goes out.
Which circuit elements are to be inserted at A and B ?

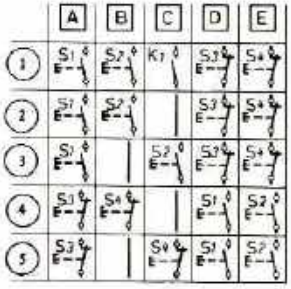


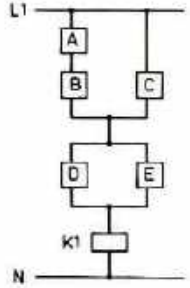


Elektr.

C 8.1

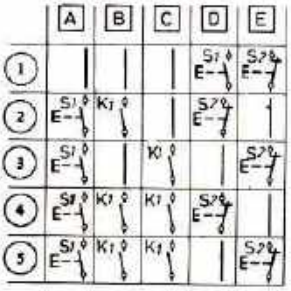
The circuit shown in the figure should perform the following function:
When two push buttons S1 and S2 are operated simultaneously, contactor K1 is operated and remains energized till push buttons S3 and S4 are pressed simultaneously.
Which of the circuit elements are to be inserted at the places marked by the letters from A to E ?

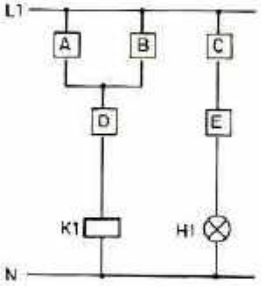




C 8.2

The circuit shown in the figure should perform the following function:
When the push button S1 is operated, contactor K1 is energized. The lamp H1 also glows till the second push button S2 is pressed
Which of the circuit elements should be inserted at the places marked from A to E ?



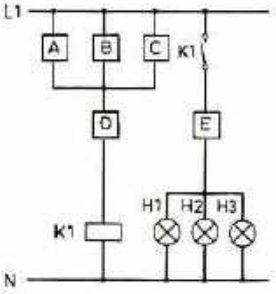


Electr.

C 9.1

The circuit shown in the figure should perform the following function:
When push button S1 or S2 is operated, the indicator lamps H1 H2 and H3 glow till a push button S3 is pressed.
Which of the following circuit elements should be inserted at the places marked from A to E ?

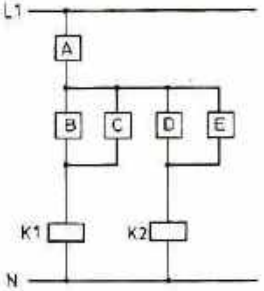
	A	B	C	D	E
1	S1 E	S2 E	K1	S3 E	K1
2	S1 E		K1	S2 E	S3 E
3	S1 E	S2 E	K1		S3 E
4	S1 E	S2 E		S3 E	
5	S1 E	S2 E	K1	S3 E	

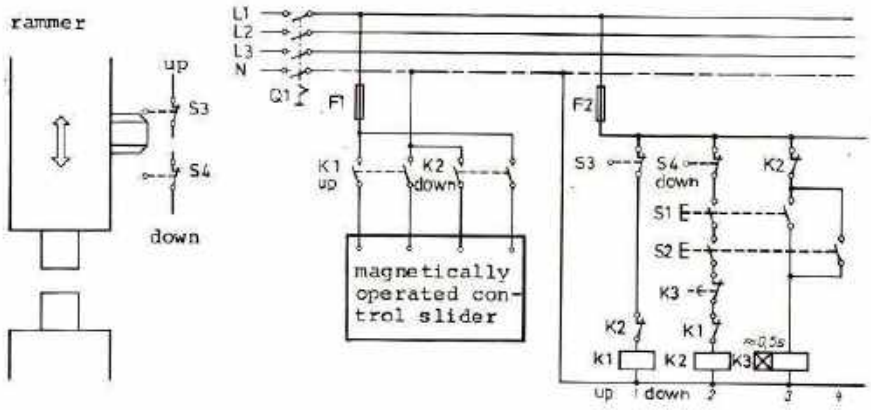


C 9.2

The circuit shown in the figure should perform the following function:
When the push button S1 is operated, contactor K1 operates and remains energized as long as the button remains pressed.
When another push button S2 is operated, the contactor K1 operates also and remains energized till a push button S3 is pressed.
Which of the circuit elements should be inserted at the places marked from A to E ?

	A	B	C	D	E
1	S2 E	S1 E	K2	S2 E	K2
2	S2 E	S2 E	K2	S3 E	K2
3	S2 E	S1 E	K1	S2 E	K2
4	S2 E	S1 E	K2	S2 E	K2
5	S2 E	S1 E	K2	S2 E	K1





Hints on the circuit:
According to the measures for the safeguard from accidents the press should be switched on only when both the hands of the operator are out of the danger zone. This measure is fulfilled by placing two push buttons lying apart which have to be operated simultaneously to switch ON the press. If the operator jams one of the push buttons for his convenience the press should not start by pressing the second button alone. The auxiliary contact K1 fulfils this requirement.

The figure shows the control circuit of a hydraulic press.
How is the stroke of the rammer limited ?

(1) By pressing and releasing S1.

(2) By pressing and releasing S1 and S2.

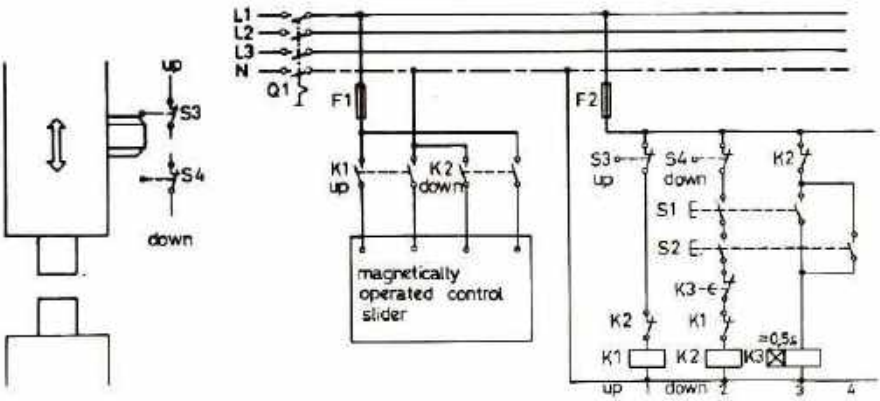
(3) By the design of the magnetically operated control slider.

(4) By the means of the stroke length of the hydraulic cylinder.

(5) By two limit switches.

C 10.1

Electr.



Hints on the circuit:
According to the measures for the safeguard from accidents the press should be switched on only when both the hands of the operator are out of the danger zone. This measure is fulfilled by placing two push buttons lying apart which have to be operated simultaneously to switch on the press. If the operator jams one of the push buttons for his convenience the press should not start by pressing the second button alone. The auxiliary contact K1 fulfils this requirement.

The figure shows the control circuit of a hydraulic press.
The rammer is on the left side as shown in the diagram.
What happens when Q1 is switched ON ?

(1) The rammer does not change its position.

(2) The rammer moves down to the final position and stops there.

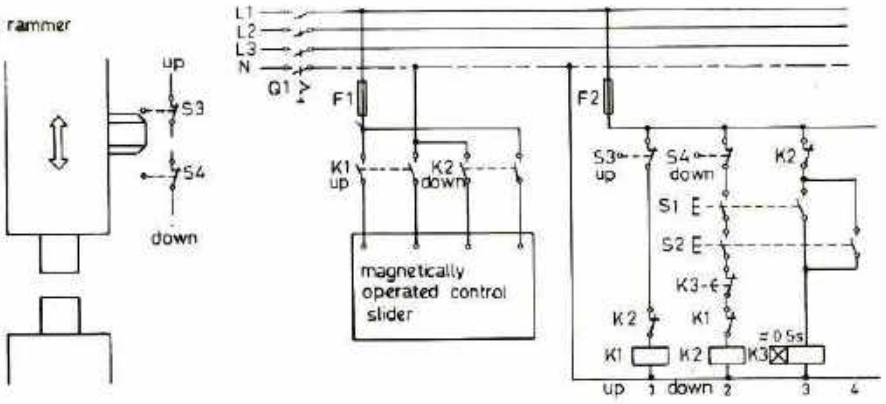
(3) The rammer first moves to the end position down then it moves to the end position up.

(4) The rammer moves to the end position up and stops there.

(5) The rammer first moves to the end position up then it moves to the end position down.

C 11.1

Electr.



Hints on the circuit:
According to the measures for the safeguard from accidents the press should be switched on only when both the hands of the operator are out of the danger zone. This measure is fulfilled by placing two push buttons lying apart which have to be operated simultaneously to switch on the press. If the operator jams one of the push buttons for his convenience the press should not start by pressing the second button alone. The auxiliary contact K1 fulfils this requirement.

The figure shows the control circuit of a hydraulic press.
What is the function of the relay K3 ?

(1) The rammer remains for 0.5 seconds in the position down and then moves to position up.

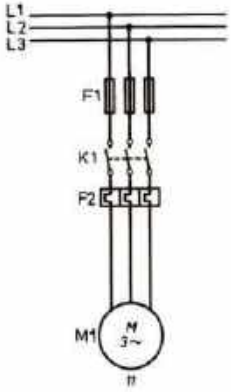
(2) 0.5 seconds after S1 and S2 are operated simultaneously the rammer moves to the position down.

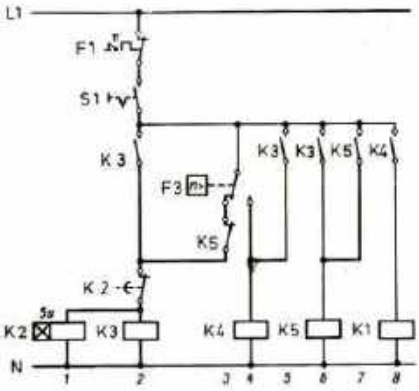
(3) The rammer remains in position up for 0.5 seconds and then moves to position down.

(4) The rammer moves down only when there is a time lag of 0.5 seconds between the operation of S1 and S2.

(5) The rammer moves down only when S1 and S2 are operated almost simultaneously.

C 14.1





Hints on the circuit:
There is a danger with a conveyor belt that too heavy jobs might be placed on it or some jobs might cause jamming of the belt. One should not be in a position to switch ON the conveyor belt when it is jammed and it must stop automatically when the speed of the conveyor belt is less than the permissible limit. An automatic belt controller is connected in the circuit for this purpose. It closes the circuit of current path 4 when the belt runs at a specific speed.

C 13.1

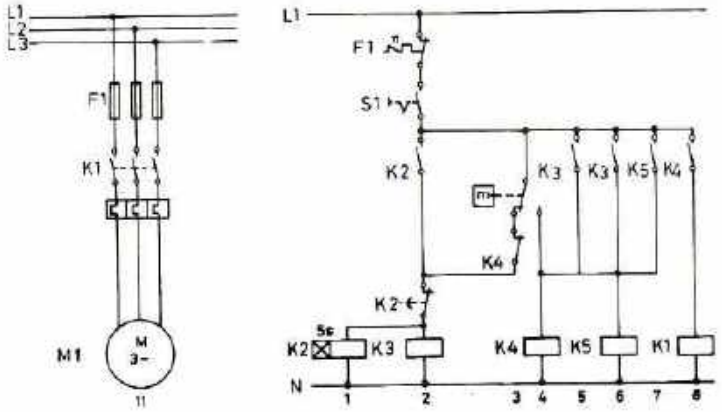
The figure shows a belt-control circuit with an automatic belt controller. Which contact opens 3 seconds after switching ON S1 ?

(1) K2 in current path 2
(2) K5 in current path 3
(3) K3 in current path 5
(4) K5 in current path 7
(5) K4 in current path 8

C 13.2

The figure shows a belt-control circuit with an automatic belt controller. S1 is switched ON. Which of the contacts closes 8 seconds after the belt is jammed ?

(1) K3 in current path 2
(2) F3 in current path 3
(3) K5 in current path 3
(4) K5 in current path 7
(5) K4 in current path 8



Hints on the circuit:
There is a danger with a conveyor belt that too heavy jobs might be placed on it or some jobs might cause jamming of the belt. One should not be in a position to switch on the conveyor belt when it is jammed and it must stop automatically when the speed of the conveyor belt is less than the permissible speed limit. An automatic belt controller is connected in the circuit for this purpose. It closes the circuit of current path 4 when the belt runs at a specific speed.

The figure shows a belt-control circuit with an automatic belt controller. S1 is switched ON.
Which of the following contacts is closed 8 seconds after switching ON when the belt has reached its operating speed ?

(1) K3 in current path 2

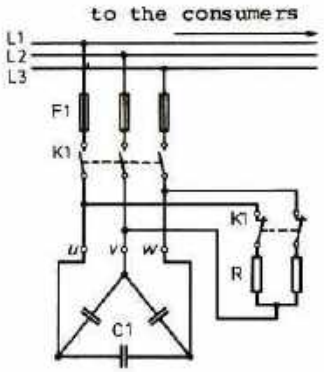
(2) K3 in current path 5

(3) K5 in current path 3

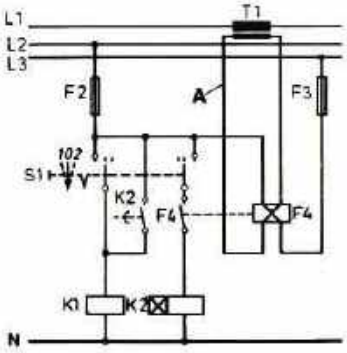
(4) K3 in current path 6

(5) K5 in current path 7

C 14.1



main circuit



control circuit

Hints on the circuit:
The above shown circuit serves for reactive power compensation. The capacitors can be switched ON manually or automatically. When reactive power is drawn by the circuit, contactor K1 pulls the armature. This function is fulfilled by relay F4. The time relay K2 prevents the operation of contactor K1 in case of reactive power surge of a short duration.

Which of the following statements is correct for the circuit shown in the figure ?

When S1 is in position 2 the capacitors C1

(1) switch ON immediately.

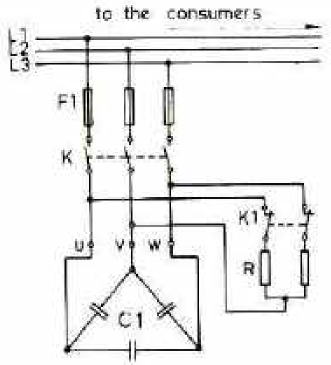
(2) switch ON immediately if the consumer draws reactive power.

(3) switch ON in every case after a speicifically adjusted time.

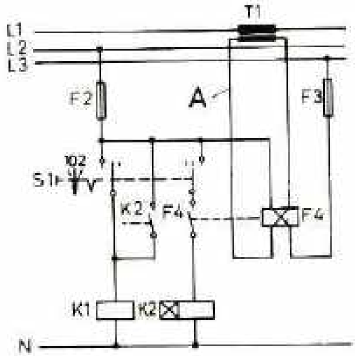
(4) switch ON immediately and after a specifically adjusted time switch OFF automatically.

(5) switch ON after a specifically adjusted time if the consumer draws reactive power.

C 15.1



main circuit



control circuit

Hints on the circuit:
The above shown circuit serves for reactive power compensation. The capacitors can be switched on manually or automatically. When reactive power is drawn by the circuit, contactor K1 pulls the armature. This function is fulfilled by relay F4. The time relay K2 prevents the operation of contactor K1 in case of reactive power surge of a short duration.

What is the purpose of the delay time relay K2 in the control circuit ?

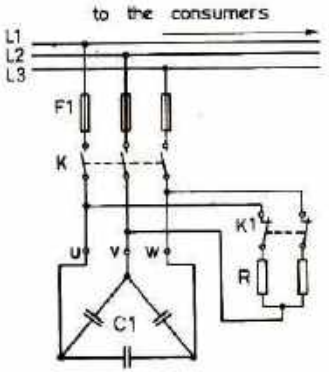
(1) It prevents the operation of K1 in case of reactive power surge of a short duration.

(2) After the capacitor is switched ON this relay is used to switch ON the resistances R.

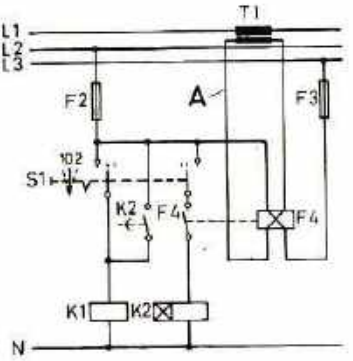
(3) It prevents the capacitors from switching OFF when the supply circuit is broken.

(4) It delays the switching ON of the discharge resistances after the capacitor is switched OFF.

(5) It prevents the capacitors from being switched OFF if the reactive power is not drawn for a short time.



main circuit



control circuit

Hints on the circuit:
The above shown circuit serves for reactive power compensation. The capacitors can be switched on manually or automatically. When reactive power is drawn by the circuit, contactor K1 pulls the armature. This function is fulfilled by relay F4. The time relay K2 prevents the operation of contactor K1 in case of reactive power surge of a short duration.

The switch S1 is in position 1 in the figure.
What happens if the inductive power is no more drawn by the circuit ?

(1) The capacitors remain in circuit.

(2) The capacitors are immediately switched OFF automatically.

(3) The capacitors are immediately switched OFF automatically and discharged.

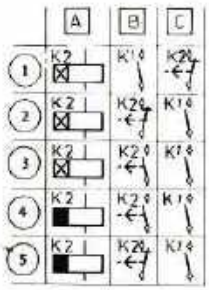
(4) The capacitors are switched OFF automatically after an adjusted time but are not discharged.

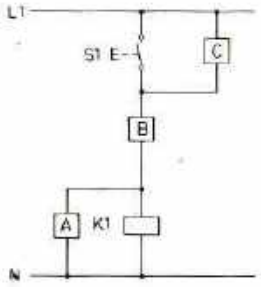
(5) The capacitors are switched OFF automatically after an adjusted time and are discharged.

C 17.1

C 18.1

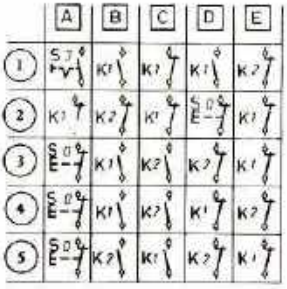
The circuit shown in the figure should perform the following function:
When S1 is operated, contactor K1 operates and releases after a few seconds. Which of the circuit elements should be inserted at A, B and C ?

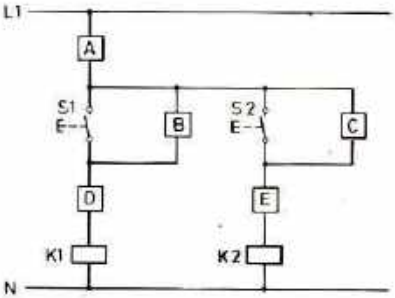




C 18.2

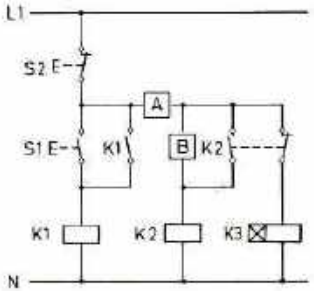
The circuit shown in the figure should perform the following function:
When S1 is pressed for a short time, contactor K1 operates and remains energized. Similarly contactor K2 is energized by S2. By operating another push button S0, the energized contactor is released. The contactors K1 and K2 are not allowed to be switched ON simultaneously. They are thus to be electrically interlocked against one another.
Which of the circuit elements should be inserted at the places from A to E ?





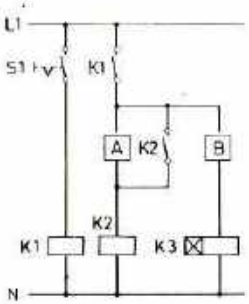
C 19.1

The circuit shown in the figure should perform the following function:
When S1 is operated, contactor K1 is energized. A little later K2 is also energized. Both the contactors are released by pressing S2.
Which of the circuit components should be inserted at A and B ?



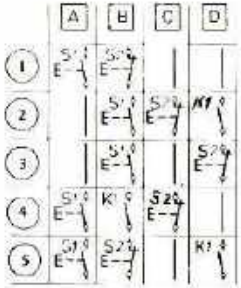
C 19.2

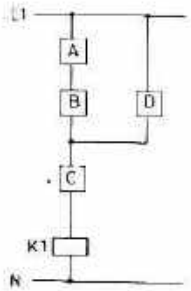
The circuit shown in the figure should perform the following function:
When S1 is switched ON, contactor K1 is energized immediately, while K2 energizes after some seconds. When S1 is switched OFF, both K1 and K2 are released.
Which of the circuit components should be inserted at A and B ?



C 20.1

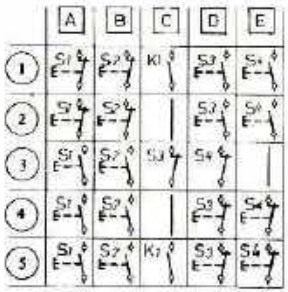
The circuit shown in the figure should perform the following function:
When push button S1 is operated, contactor K1 is energized till a second push button S2 is pressed.
Which of the circuit components are to be inserted at the places marked by the letters A to D ?

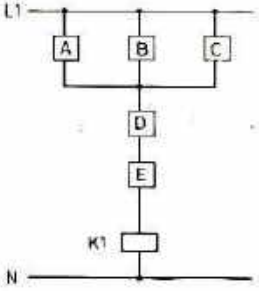


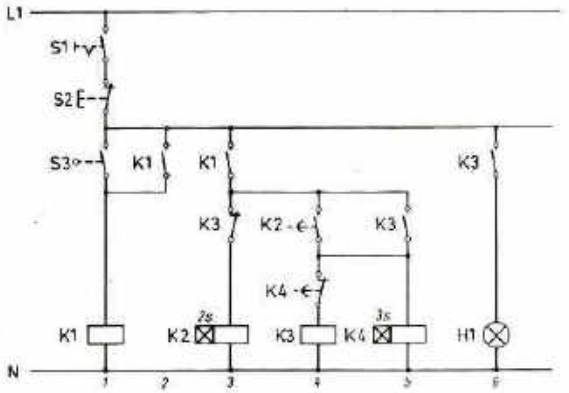


C 20.2

The circuit shown in the figure should perform the following function:
When push button S1 or S2 is operated, contactor K1 is energized till another push button S3 or S4 is operated.
Which of the circuit elements are to be inserted at the places marked by the letters A to E ?







C 21.1

The figure shows the wiring diagram of a blinking warning system. What is the correct state of the contacts of the contactor K3 ?

(1)

C	O
3	-
5	
6	

(2)

C	O
3	-

(3)

C	O
3	5
	6

(4)

C	O
5	3
6	

(5)

C	O
-	3
	5
	6

C 21.2

The figure shows the wiring diagram of a blinking warning system. Due to a fault S3 remained operated for 50 seconds. After this period the fault was removed. The contact of S3 went back to the original position.
Which of the following statements is correct for the circuit *when S1 is switched on* ?

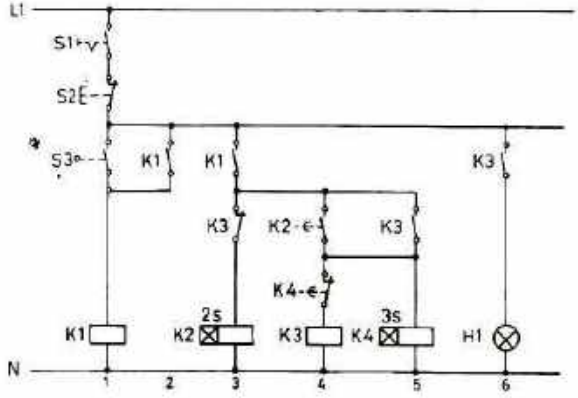
(1) H1 immediately stops blinking.

(2) H1 stops blinking after 2 seconds.

(3) H1 stops blinking after 3 seconds.

(4) H1 stops blinking immediately after S2 is operated.

(5) H1 stops blinking after 2 or 3 seconds after S2 is operated.



C 22.1

The figure shows the wiring diagram of a blinking warning system. S3 is operated due to a fault, S2 is pressed without removing this fault. What is its effect ?

(1) The blinking stops till the next fault occurs.

(2) Operating of S2 does not stop blinking.

(3) After releasing S2 the blinking starts again.

(4) After releasing S2 the lamp H1 glows and subsequently starts blinking.

(5) 2 seconds after releasing S2 H1 starts blinking again.

C 22.2

In the blinking warning system of the figure the fault is indicated when S3 is operated. Which of the statements is correct for the push button S2 in this circuit ?

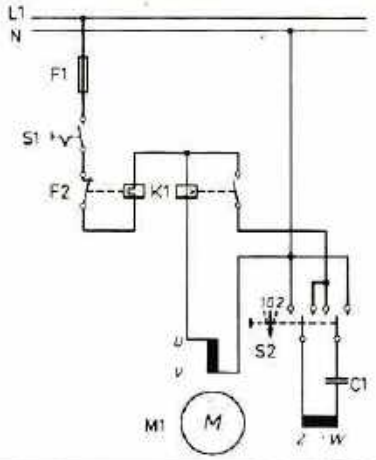
(1) S2 puts the warning system out of function.

(2) S2 serves to test the functioning of the system.

(3) S2 releases the switching state of the system after removing the fault.

(4) S2 serves to remove the fault.

(5) S2 has no function in this circuit and thus could be removed. It is needed only when S1 is a push button.



What does the shown circuit represent ?

(1) A single phase induction motor with an operating capacitor for both the directions of rotation.

(2) A single phase induction motor with a starting capacitor for both the directions of rotation.

(3) A single phase induction motor with an operating capacitor for two rotational speeds.

(4) A single phase induction motor with a starting capacitor for two rotational speeds.

(5) A single phase induction motor with a starting capacitor for two nominal voltages.

EM 1.1

What changes when switch S2 is operated ?

(1) The working voltage

(2) Number of revolutions

(3) The direction of rotation

(4) The starting torque

(5) The nominal torque

EM 1.2

EM 2.1

What does the shown circuit represent ?

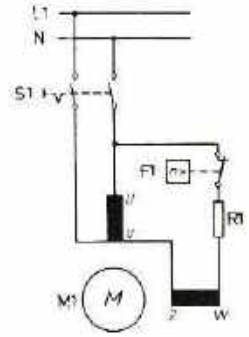
(1) Universal motor

(2) Shaded-pole motor

(3) Resistance start single phase induction motor

(4) Capacitor start single phase induction motor

(5) Reluctance motor



EM 2.2

What does the shown circuit represent ?

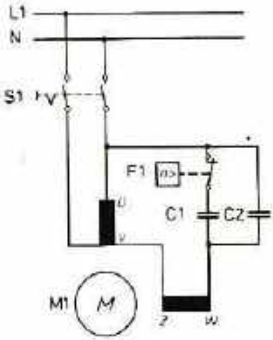
(1) Single phase induction motor with two operating capacitors for two speeds

(2) Single phase induction motor with a starting and an operating capacitor

(3) Single phase induction motor with two starting capacitors for both directions of rotation

(4) Single phase induction motor with one starting and one interference elimination capacitor

(5) Single phase induction motor with an operating and an interference elimination capacitor



EM 2.3

At which of the following nominal speeds does the motor M1 run, when only contactor K1 is energized ?

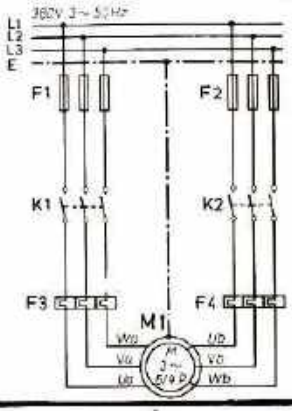
(1) 2880 rpm

(2) 1440 rpm

(3) 965 rpm

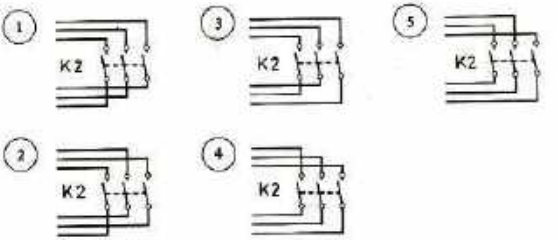
(4) 720 rpm

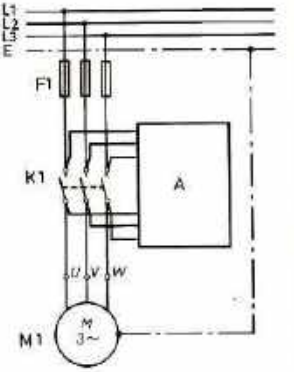
(5) 460 rpm



EM 3.1

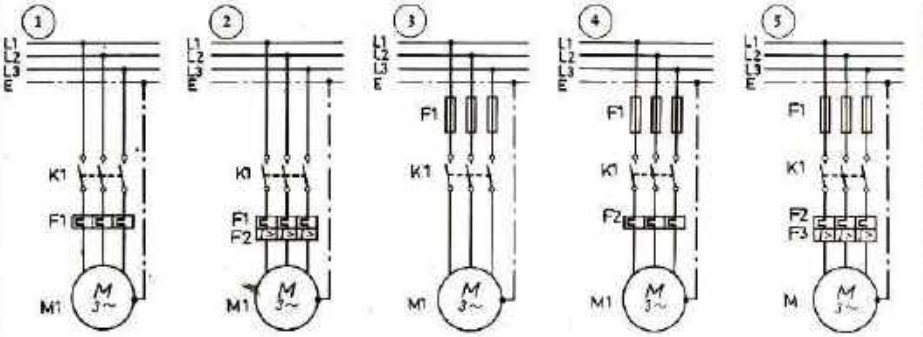
The motor M1 is to be switched ON by contactor K1 to run in a clockwise direction and with contactor K2 to run in an anti-clockwise direction. Which of the following switching circuits is to be inserted at A ?





EM 3.2

The motor M1 is to be operated by the contactor K1.
A protection from an overload and from a short circuit of the motor is to be provided. Which of the following circuits fulfils this purpose ?



EM 4.1

The figure represents the wiring diagram of a main circuit. What is the function of the resistance R1 in phase L2 ?

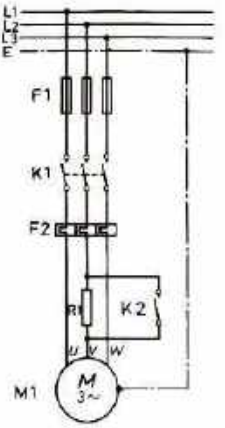
(1) To lower the starting current in all the phases.

(2) To ensure a smooth and reverse free starting of the motor.

(3) To increase the starting torque.

(4) To increase the maximum torque.

(5) To suppress current peaks by reverse current breaking.



EM 4.2

What does the shown circuit represent?

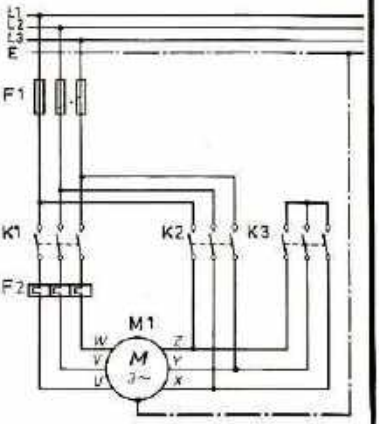
(1) A pole changing three phase motor with tapped winding (Dahlander Circuit).

(2) A pole changing three phase motor with two separate windings.

(3) Star delta starting circuit of a three phase motor.

(4) The circuit of a three phase induction motor for two different voltages.

(5) Kusa circuit of a three phase induction motor.



EM 4.3

For which of the following purposes is the wiring shown in the figure most suitable ?

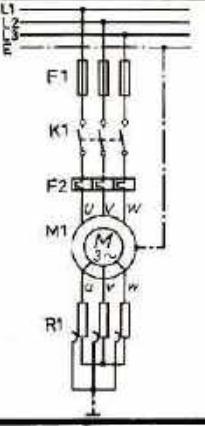
(1) For high speed

(2) For low speed

(3) For heavy duty start

(4) For low loss speed control

(5) For a speed higher than the synchronous speed



EM 5.1

What does the shown circuit represent ?

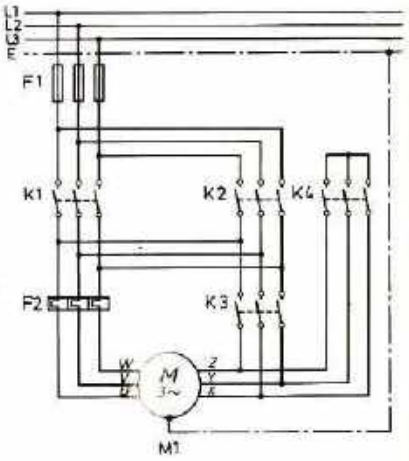
(1) Kusa circuit for a three phase induction motor for two rotational directions.

(2) Star-delta starting of a three phase motor for one direction of rotation.

(3) Star-delta starting of a three phase motor for both directions of rotation.

(4) Circuit of a three phase pole changing motor for one direction of rotation.

(5) Circuit of a three phase pole changing motor for both directions of rotation.



EM 5.2

What does the shown circuit represent ?

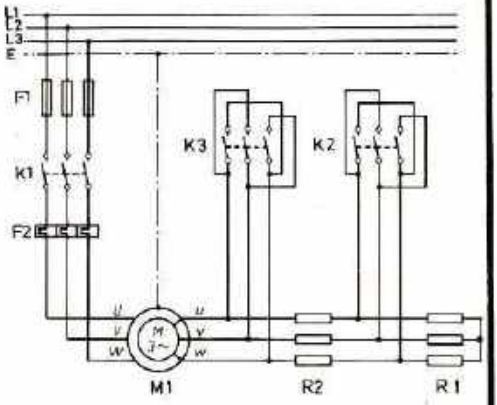
(1) A three phase slip ring motor with three stage resistance braking.

(2) A three phase slip ring motor for three synchronous speeds.

(3) A three phase slip ring motor with three stage regenerative braking.

(4) A three phase slip ring motor with changeable winding for four speeds.

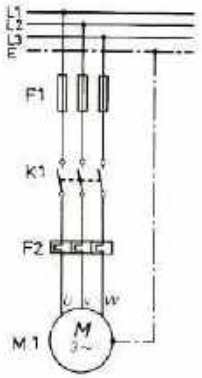
(5) Starting circuit of a three phase slip ring motor.

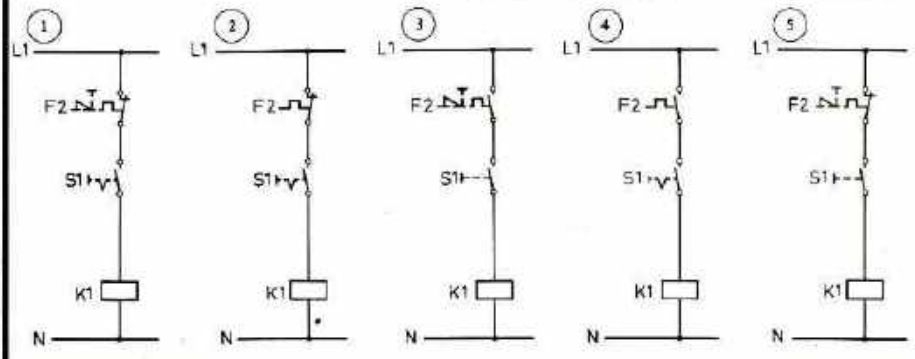


Electr.

EM 6.1

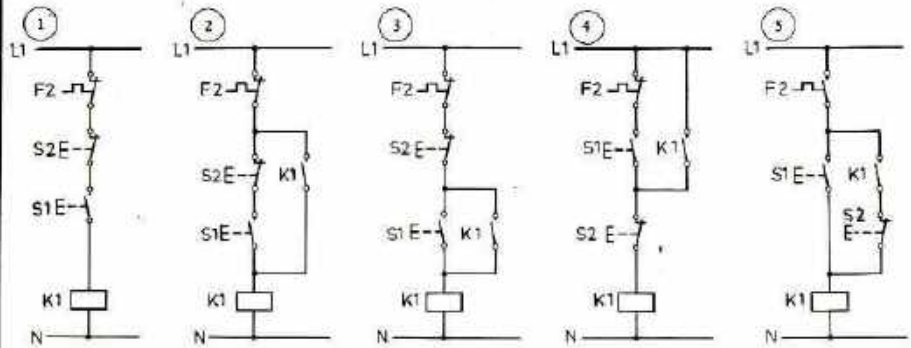
The motor M1 shown in the circuit of the figure is to be switched ON and OFF by means of switch S1.
Which of the following control circuits fulfils this purpose ?





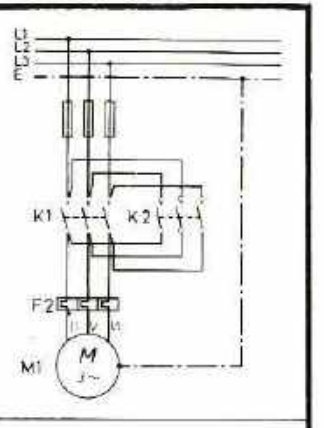
EM 6.2

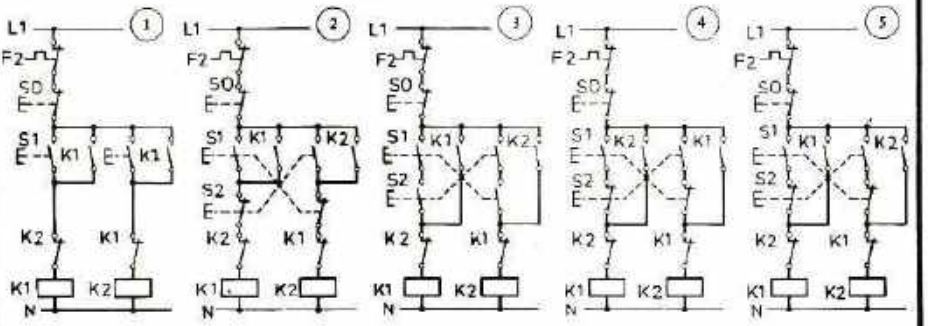
The motor M1 shown in the circuit of the above figure is to be switched ON by operating a push button S1. The motor should keep running till another push button S2 is pressed.
Which of the following control circuits fulfils this purpose ?



EM 7.1

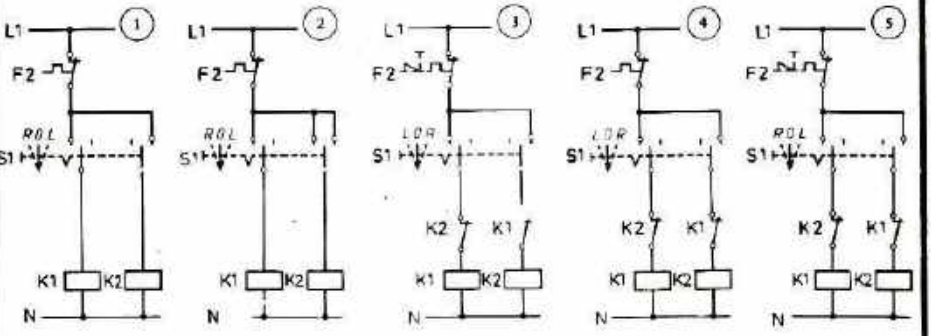
The motor M1 shown in the circuit of the figure is to be run in a clockwise direction by operating a push button S1 and in anticlockwise direction by operating S2. After pressing the push button S0 the motor stops. The change over should be possible directly and without intermediate operation of S0.
Which of the following control circuits fulfils this purpose ?

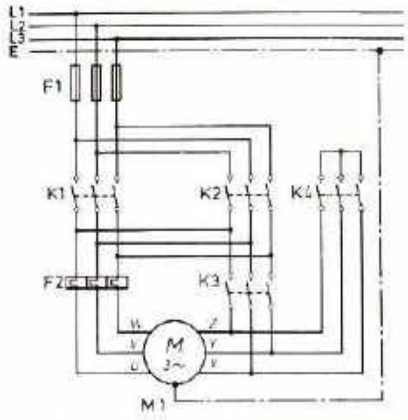




EM 7.2

The motor M1 shown in the circuit of the figure is to be switched ON for rotating clockwise or anticlockwise with the help of a three position changeover switch.
Which of the following control circuits fulfils this purpose ?





EM 8.1

Which of the contactors are energized when the motor rotates in star connection in anticlockwise direction ?

(1) The contactors K1, K3 and K4

(2) The contactors K1 and K3

(3) The contactors K2 and K3

(4) The contactors K1 and K4

(5) The contactors K2 and K4

EM 8.2

Which of the contactors are energized when the motor rotates in delta connection in clockwise direction ?

(1) Only contactor K1

(2) Only contactor K2

(3) The contactors K1 and K4

(4) The contactors K1 and K3

(5) The contactors K2 and K3

EM 8.3

Which of the contactors are energized when the motor rotates in delta connection in anticlockwise direction ?

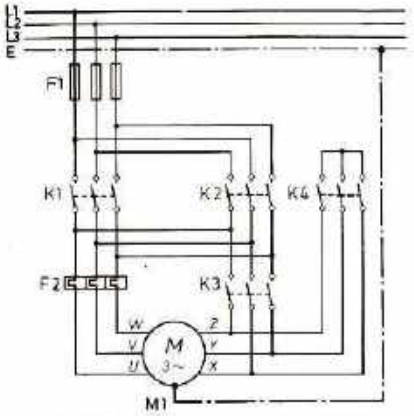
(1) Only contactor K1

(2) Only contactor K2

(3) The contactors K1 and K4

(4) The contactors K2 and K4

(5) The contactors K2 and K3



EM 9.1

Which of the following statements is true for the relay marked F2 ?

(1) The relay provides an overload protection of the motor circuit only in case of delta connection.

(2) The relay provides an overload protection of the motor circuit only in case of star connection.

(3) The relay provides an overload protection for the motor winding in star as well as delta connection.

(4) The relay provides an overload and short circuit protection for the motor winding in star connection.

(5) The relay provides an overload and short circuit protection for the motor winding in star as well as in delta connection.

EM 9.2

The motor M1 shown in the figure is set to run in an anticlockwise direction. In which sequence should the contactors operate ?

(1) K2 energizes - K3 energizes - K3 releases - K4 energizes

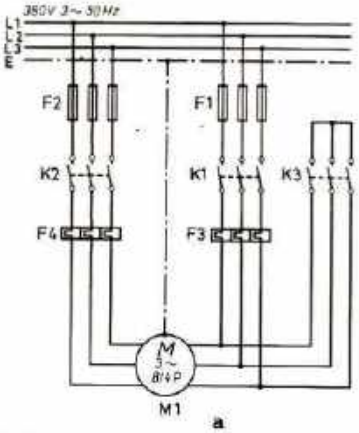
(2) K1 energizes - K4 energizes - K4 releases - K3 energizes

(3) K4 energizes - K1 energizes - K4 releases - K3 energizes

(4) K4 energizes - K2 energizes - K4 releases - K3 energizes

(5) K4 energizes - K2 energizes - K3 energizes - K4 releases

EM 10.1



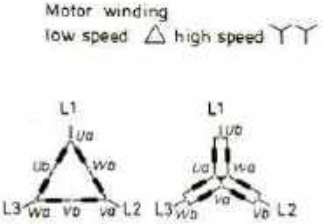
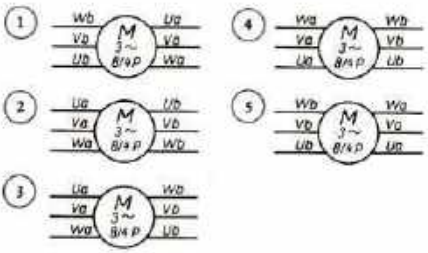


Fig. a shows the main circuit of a three phase motor.
If the motor windings are connected as shown in fig. b, how should the terminals be indicated on the symbol of the motor ?



EM 10.2

What are the synchronous speeds of motor M1 in fig. a ?

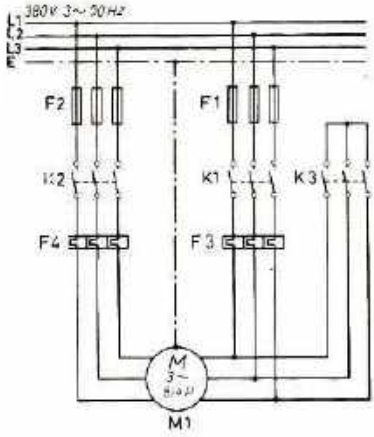
(1) 1000 rpm and 1500 rpm

(2) 750 rpm and 1500 rpm

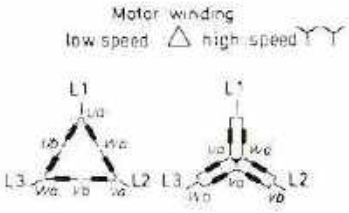
(3) 500 rpm and 1000 rpm

(4) 500 rpm and 750 rpm

(5) 375 rpm and 750 rpm



a



b

In fig. a the contactor K1 is energized, the contactors K2 and K3 are in normal position. When the connections are correct, what is the synchronous speed of the motor when the motor windings are connected as in fig. b ?

(1) 375 rpm
(2) 750 rpm
(3) 1000 rpm
(4) 1500 rpm
(5) 3000 rpm

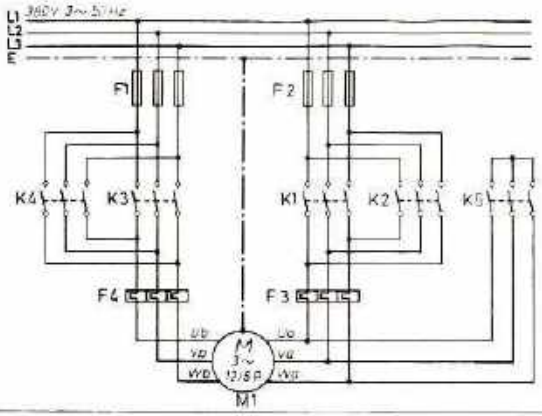
EM 11.1

In fig. a the contactor K1 is in normal position and the contactors K2 and K3 are energized. When the connections are correct, what is the synchronous speed of the motor M1 when the motor windings are connected as in fig. b ?

(1) 375 rpm
(2) 750 rpm
(3) 1000 rpm
(4) 1500 rpm
(5) 3000 rpm

EM 11.2

Electr.



In the figure a circuit of a three phase motor is shown. Which of the following circuits does it represent ?

(1) Star delta starting circuit with two speeds.

(2) The circuit of a pole changing motor for two speeds and one direction of rotation.

(3) The circuit of a pole changing motor for two speeds and two directions of rotation.

(4) The circuit of a pole changing motor with star delta starter for one direction of rotation.

(5) The circuit of a pole changing motor with star delta starter for two directions of rotation.

EM 12.1

The motor shown in the figure rotates in clockwise direction at 980 rpm. Which of the contactors are operated ?

(1) The contactors K3 and K5

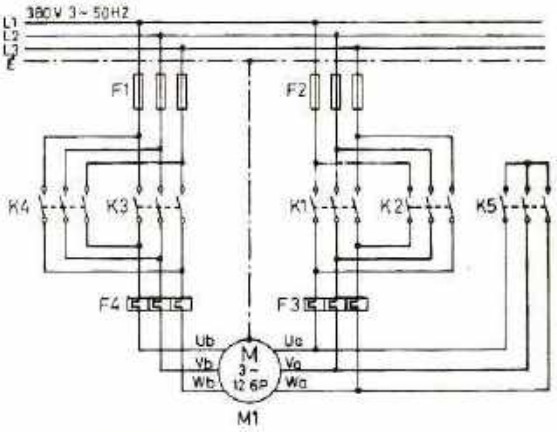
(2) The contactors K1 and K5

(3) The contactors K4 and K5

(4) The contactors K2 and K5

(5) Only contactor K1

EM 12.2



The motor shown in the figure rotates anticlockwise with 480 rpm. Which of the contactors are energized ?

(1) Only contactor K3

(2) The contactors K3 and K5

(3) Only contactor K1

(4) The contactors K1 and K3

(5) Only contactor K2

EM 13.1

The motor M1 shown in the figure runs in a clockwise direction with 980 rpm. Due to a fault in the bearing it is overloaded. Which of the following statements is true ?

After some time

(1) one of the fuses in F2 will blow off.

(2) one of the fuses in F1 will blow off.

(3) one of the fuses in F1 will blow off or F4 will respond.

(4) one of the fuses in F2 will blow off or F3 will respond.

(5) F4 responds.

EM 13.2

EM 14.1

What are the synchronous speeds of the motor M1 in the figure ?

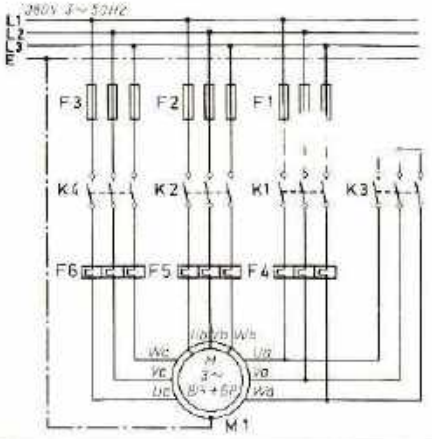
(1) 375, 500 and 750 rpm

(2) 500, 750 and 1000 rpm

(3) 500, 750 and 1500 rpm

(4) 750, 1000 and 1500 rpm

(5) 1000, 1500 and 3000 rpm



EM 14.2

Which of the statements is true for the circuit of motor M1 shown in the figure ?

In this circuit the motor M1 has

(1) two speeds in a clockwise direction and one speed in an anticlockwise direction.

(2) one speed in a clockwise direction and two speeds in an anticlockwise direction.

(3) three speeds only in a clockwise direction.

(4) three speeds in both directions.

(5) three speeds only in an anticlockwise direction.

EM 14.3

Which type of windings has the motor M1 in the figure ?

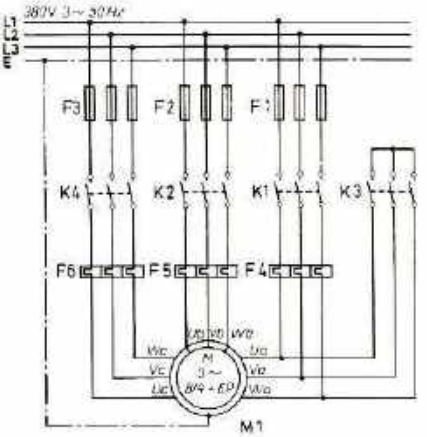
(1) Three separate windings for three speeds.

(2) One winding tapped wound (Dahlander circuit) for three speeds.

(3) Two windings tapped wound (Dahlander circuit),

(4) One winding tapped wound (Dahlander circuit) and another winding.

(5) One winding tapped wound (Dahlander circuit) and two more windings.



EM 15.1

The motor M1 in the figure runs a machine tool. During the operation at middle speed a fuse blows due to a fault in the windings. Which of the following statements is true ?

Till a new motor is arranged

(1) the machine tool cannot be used at all.

(2) the motor can run only at higher speeds temporarily.

(3) the motor can run only at lower speeds temporarily.

(4) the motor can run at higher and lower speeds temporarily.

(5) the motor can run at all speeds temporarily.

EM 15.2

The motor M1 shown in the figure runs at 712 rpm.
Which of the contactors are energized ?

(1) Only contactor K1

(2) Only contactor K2

(3) Only contactor K3

(4) The contactors K2 and K3

(5) The contactors K4 and K3

M 1.1

What does the circuit shown in the figure represent ?

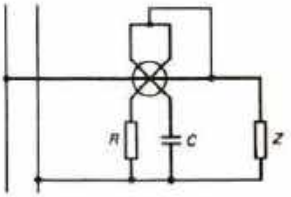
(1) Circuit for the measurement of power in D.C.

(2) Circuit for the measurement of power in three phase A.C.

(3) Circuit for frequency measurement

(4) Circuit for power factor measurement

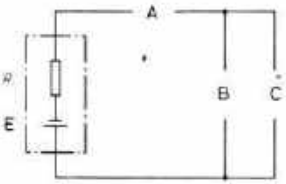
(5) Circuit for reactive power measurement



M 1.2

The circuit shown in the figure is to be completed in such a way that the internal resistance of the voltage source can be calculated with the help of the measured values.
Which of the circuit components are to be connected at A, B and C ?

	A	B	C
1	V	A	
2	A	V	
3	V		A
4		V	A
5		A	V



M 1.3

The figure shows a measuring circuit.
Which of the following values can neither be measured directly nor calculated from the measured values when the motor is running ?

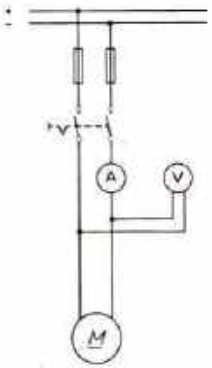
(1) Current drawn by the motor.

(2) Voltage at the motor terminals.

(3) Power consumed by the motor.

(4) Power drawn from the mains.

(5) Resistance of the motor winding.



M 2.1

Which of the values can be measured with the help of the shown circuit ?

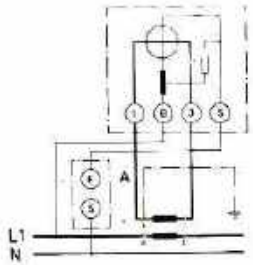
(1) The apparent power

(2) The apparent and reactive power

(3) The true power

(4) The true and reactive power

(5) The reactive power



M 2.2

The figure shown represents the circuit of an energy meter. How should the conductors A, B, C and D be connected with the meter ?

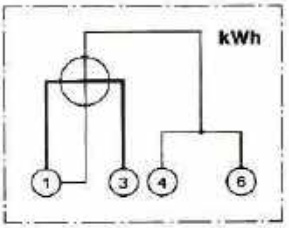
(1) A with 1, B with 4, C with 3, D with 6

(2) A with 1, B with 3, C with 4, D with 6

(3) A with 1, B with 3, C with 6, D with 4

(4) A with 1, B with 6, C with 3, D with 4

(5) A with 1, B with 4, C with 6, D with 3



M 2.3

The figure shows the circuit for the measurement of energy in a three phase circuit with the help of a three phase energy meter. How are the conductors A, B, C, D and E, F, G, H to be connected with the terminals of the meter ?

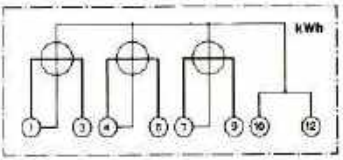
(1) A-1, B-3, C-7, D-1, 4-E, 6-F, 10-G, 12-H

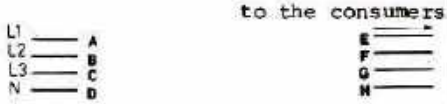
(2) A-3, B-6, C-9, D-12, 1-E, 4-F, 7-G, 10-H

(3) A-1, B-4, C-7, D-10, 3-E, 6-F, 9-G, 12-H

(4) A-1, B-4, C-7, D-12, 3-E, 6-F, 10-G, 9-H

(5) A-3, B-6, C-9, D-10, 1-E, 4-F, 7-G, 12-H





Electr.

M 3.1

A wattmeter is to be connected as shown in the figure. Which part of the component of the instrument is at A ?

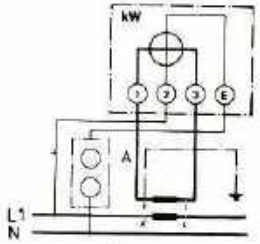
(1) A drop resistor

(2) A bypass resistor

(3) A voltage transformer

(4) An isolating terminal

(5) An earth terminal



M 3.2

M 3.2 The figure shows a circuit of a single-phase AC two-rate meter consisting of an AC energy-meter (W) and a time switch Z. How should their terminals be connected ?

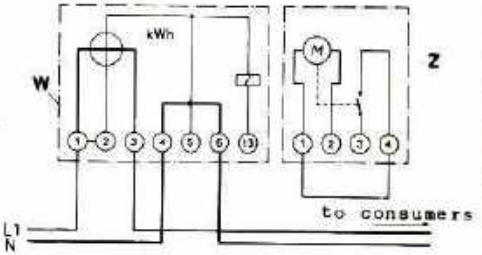
(1) W2 with Z2, W5 with Z1, W13 with Z3

(2) W2 with Z2, W5 with Z3, W13 with Z1

(3) W2 with Z1, W13 with Z2, W5 with Z2

(4) W2 with Z1, W5 with Z3, W13 with Z2

(5) W2 with Z1, W5 with Z2, W13 with Z3



M 3.3

With the help of the measuring circuit shown, the voltage of a three phase system is to be measured according to the given sequence. Which of the following statements is true ?

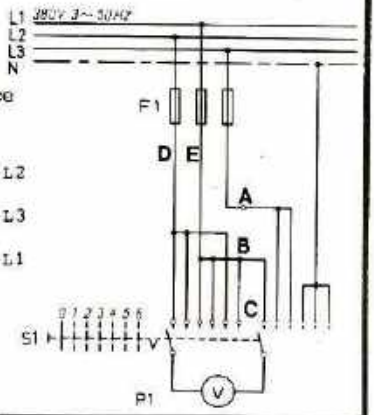
(1) The measuring circuit performs the given function correctly.

(2) The voltage change over switch and the voltmeter should not be fused.

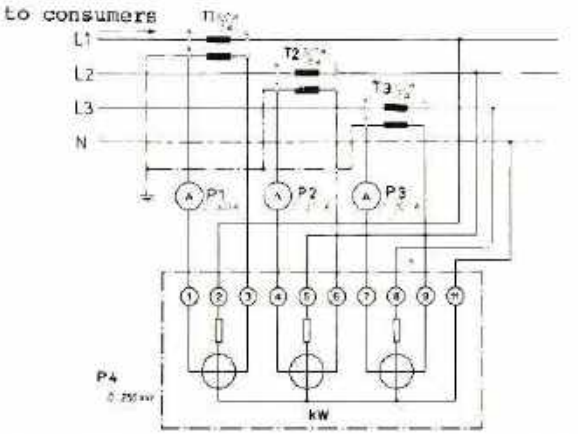
(3) The junction C of the voltmeter change over switch should not be connected with B but it must be connected with A.

(4) The measuring conductor marked D must be connected with L1 and that marked E with L2

Sequence	
0	
1	V_{L1-L2}
2	V_{L2-L3}
3	V_{L3-L1}
4	V_{L1}
5	V_{L2}
6	V_{L3}



Electr.



M 4.1

The figure shows a measuring circuit. Which of the following quantities can be measured with the help of the instrument P4 ?

(1) Total true power drawn by consumers only in case of symmetrical load.

(2) Total true power drawn by consumers at any load.

(3) Total apparent power drawn by consumers only in case of symmetrical load.

(4) Total reactive power drawn by consumers only in case of symmetrical load.

(5) Total reactive power drawn by consumers at any load.

M 4.2

The figure shows a measuring circuit. For which application is it suitable ?

(1) **Measurement of true power drawn by a three phase motor whose winding is connected in star.**

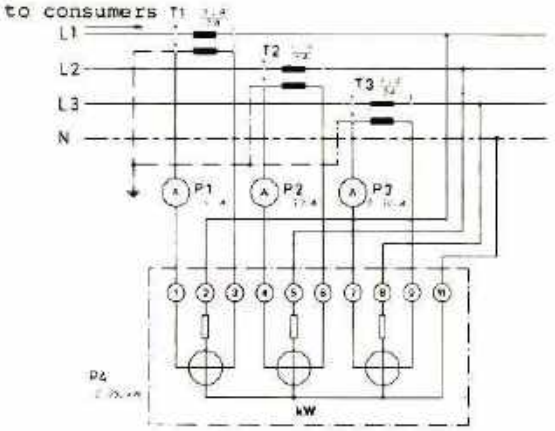
(2) **Measurement of true power drawn by a three phase motor whose winding is connected in delta.**

(3) **Measurement of true power drawn by a three phase tapped wound motor (Dahlander circuit).**

(4) **Measurement of true power in a low voltage installation with a number of single phase and three phase consumers.**

(5) **Measurement of true power in a low voltage installation with a number of three phase consumers.**

Electr.



M 5.1

The figure shows a measuring circuit. Which of the following statements is wrong for it ?

(1) T1, T2 and T3 are current transformers.

(2) The voltage coils of the measuring system are connected with terminals 2, 5, 8 and 11.

(3) The current coils of the measuring system are connected with the terminals 1, 3, 4, 6, 7 and 9.

(4) The measuring instrument P4 has three measuring systems.

(5) The inner resistances of the instrument P4 are connected in series with the corresponding current coils.

M 5.2

The figure shows a measuring circuit. What mistake is in it ?

(1) The connections at the terminals K and L of the current transformers T1, T2 and T3 should be interchanged.

(2) The connections at the terminals k and l of the current transformers T1, T2 and T3 should be interchanged.

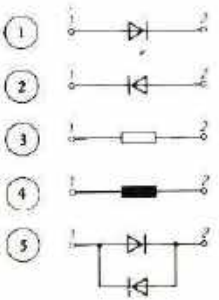
(3) The secondary of the current transformers should not be earthed.

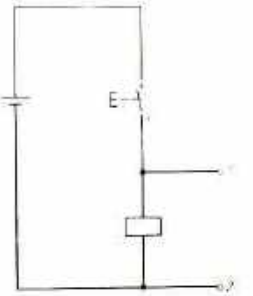
(4) The voltage coils of the meter (voltage path) should be connected with the mains before the current transformers.

(5) No ammeter should be connected in the current coil of the wattmeter.

R 1.1

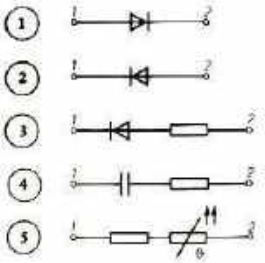
Which of the following circuit elements would prevent sparking when the push button is being opened ?

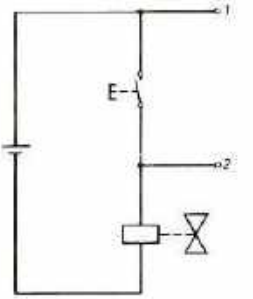




R 1.2

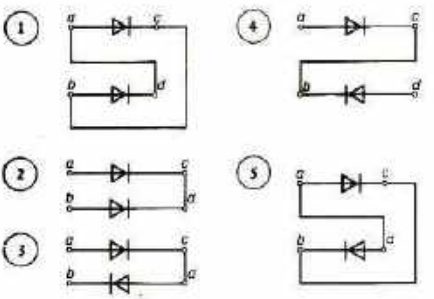
Which of the following circuit **elements** would reduce sparking **while** the push button is being **operated** ?

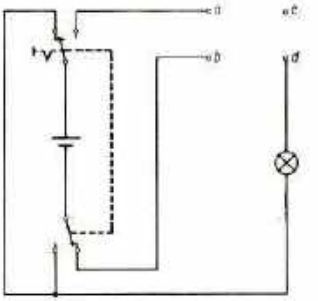




R 1.3

Which of the following additional circuit elements would not allow the lamp to glow ?

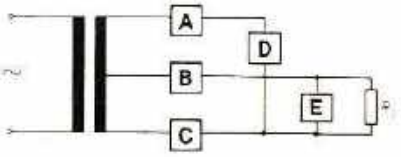




R 2.1

The middle point rectifier circuit shown in the figure is to be completed. Which of the following sets of circuit elements is to be inserted at the places marked from A to E ?

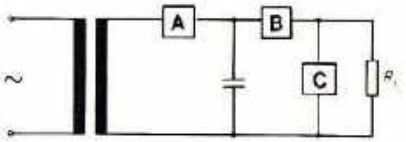
	A	B	C	D	E
1	⊳|	⊳|	⊳|	⊣⊢	▬
2	⊳|	—	⊳|	—	⊣⊢
3	⊣⊢	⊳|	⊳|	—	▭
4	⊳|	⊳|	—	—	⊣⊢
5	—	⊳|	⊳|	⊣⊢	—



R 2.2

The half wave rectifier shown in the figure is to be completed in such a way that voltage appearing across the resistance R_L has fewer ripples. Which of the rows has the right circuit elements to be inserted at the places marked from A to C ?

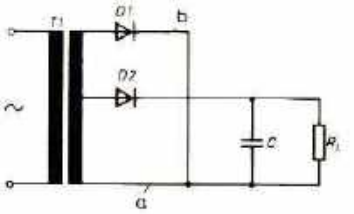
	A	B	C
1	⊳|	⊣⊢	▬
2	▭	⊣⊢	▬
3	⊳|	⊣⊢	▭
4	⊣⊢	⊳|	⊣⊢
5	⊳|	▬	⊣⊢



R 2.3

What is the mistake in the middle point rectifier circuit shown in the figure ?

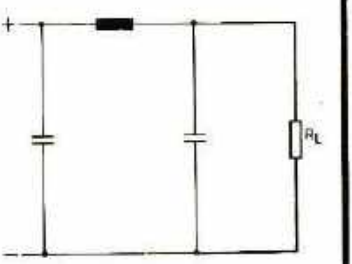
1. The diode D1 must be connected in branch a.
2. The diode D2 must be connected in branch a.
3. The capacitor must be connected in branch a and b.
4. An additional diode must be connected in branch a.
5. The capacitor must be connected in series with the load resistance R_L.



Elektr.

R 3.1

Which of the following statements is true for the circuit shown in the diagram ?



(1) The circuit increases the residual ripples of the rectified circuit.

(2) It represents a filter circuit.

(3) It serves to control a thyristor.

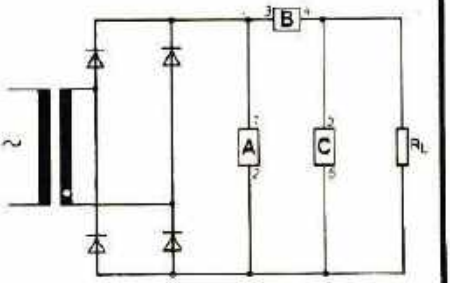
(4) It represents a voltage multiplier circuit.

(5) It represents a reactive power compensation circuit.

R 3.2

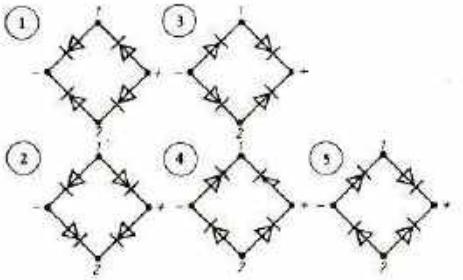
The single phase bridge rectifier circuit is to be completed by connecting a filter circuit. Which of the rows has the right circuit elements to be inserted at the places marked from A to C ?

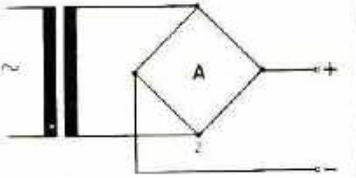
	A	B	C
(1)			
(2)			
(3)			
(4)			
(5)			



R 3.3

Which of the following bridge circuits is to be inserted at A ?



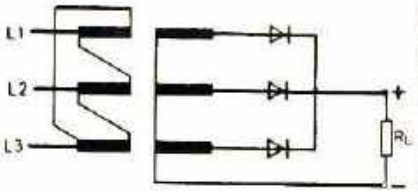


Electr.

R 4.1

What does the shown circuit represent ?

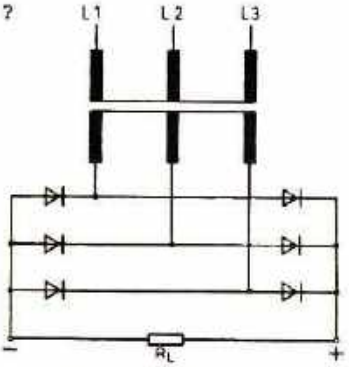
1. Three phase bridge rectifier circuit
2. Three phase star rectifier circuit
3. Double middle point rectifier circuit
4. Double star rectifier circuit
5. Half wave rectifier circuit



R 4.2

What does the shown circuit represent ?

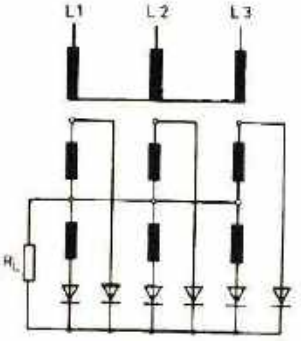
1. Triple half wave rectifier circuit
2. Star rectifier circuit
3. Three phase bridge rectifier circuit
4. Multiple phase bridge rectifier circuit
5. Double star rectifier circuit



R 4.3

What does the shown circuit represent ?

1. Three phase middle point rectifier circuit
2. Star rectifier circuit
3. Double three phase star rectifier circuit
4. Multiple phase bridge rectifier circuit
5. Three phase bridge rectifier circuit



Elektr.