KCT COLLEGE OF ENGG AND TECHNOLOGY

DEPTT. OF ELECTRICAL ENGG.

LAB MANUAL

SUBJECT: SYNCHRONOUS MACHINES

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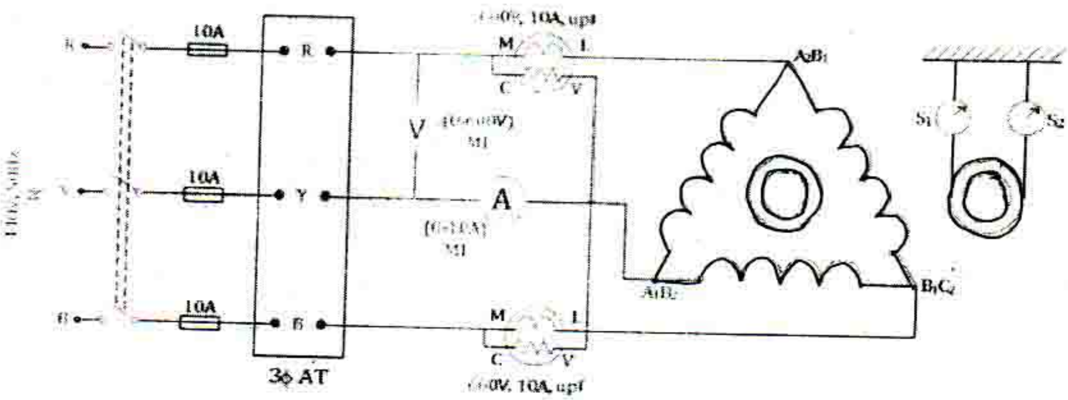
Experiment No.: 1

LOAD TEST ON SQUIRREL CAGE INDUCTION MOTOR

Aim:

To study the performance of the machine when loaded and to plot the following charac-teristics of a squirrel cage induction motor.

Circuit Diagram:



Precautions:

1. All the connections should be tight.
2. The autotransformer should be in minimum position initially.
3. The motor should be on no load at the time of starting.

Procedure:

1. Make the connections as shown in the circuit diagram.
2. After taking care of the precautions, switch on the supply.
3. Adjust the autotransformer till rated voltage is applied across the motor terminals
4. Note down all the meter readings in no-load condition.
5. Increase the load in steps until the ammeter reads the rated current and note downall the meter reading for each applied load.
6. Reduce the load to zero, bring the autotransformer to the minimum position andswitch off the supply.

Equations and Calculations:

$$\text{Voltage } V = \ldots\ldots V$$
$$\text{Current } I = \ldots\ldots A$$
$$W_1 = \ldots\ldots W$$
$$W_2 = \ldots\ldots W$$
$$\text{I/P power} = W_1 - W_2 = \ldots\ldots W$$
$$\text{Speed } N = \ldots\ldots \text{rpm}$$
$$S_1 = \ldots\ldots \text{kg}$$
$$S_2 = \ldots\ldots \text{kg}$$
$$\text{Torque } T = (S_1 - S_2)rg = \ldots\ldots \text{Nm}$$
$$\text{O/P power} = \frac{2\pi NT}{60} = \ldots\ldots W$$
$$\text{Power Factor } \cos\phi = \ldots\ldots$$
$$\text{Slip } s = \frac{N_s - N}{N_s} \times 100 = \ldots\ldots \%$$
$$\text{Efficiency } \eta = \frac{\text{O/P}}{\text{I/P}} \times 100 = \ldots\ldots \%$$

Here r is the radius of the break drum and g is the acceleration due to gravity.

Result:

Observation Table:

Sl. No.	V_1 (V)	A_1 (A)	W_1 (W)	W_2 (W)	N (rpm)	S_1 (kg)	S_2 (kg)	i/p (W)	T (Nm)	o/p (W)	cos φ	%s	η
1													
2													
3													
1 4	2	3	4	5	6	7	8	9	10	11	12	13	14
5													
6													

Experiment No.: 2

NO LOAD AND BLOCKED ROTOR TEST ONSLIP-RING INDUCTION MOTOR

Aim:

To conduct no load and blocked rotor test on slip-ring induction motor and to draw itsequivalent circuit and circle diagram.

Machine Details:

Refer name plate of the machine.

Precautions:

1. The autotransformer should be in minimum position while switching on the supply.
2. The motor should not be on load while starting.

Procedure:

No-load test

1. After taking care of the precautions, switch on the supply.
2. Adjust the autotransformer gradually such that the rated voltage is applied to thestator.
3. Note down all the meter readings under no-load condition.
4. Reduce the autotransformer to minimum position.5. Switch off the supply

.Blocked rotor test

1. After taking care of the precautions, switch on the supply.
2. Adjust the autotransformer till the rated current flows through the stator
3. Take all the meter readings.
4. Reduce the autotransformer to minimum position
5. Switch off the supply.

Equations and Calculations:

$$\text{Voltage } V = \ldots\ldots V$$

$$\text{Current } I = \ldots\ldots A$$

$$W_1 = \ldots\ldots W$$

$$W_2 = \ldots\ldots W$$

$$\text{I/P power} = W_1 + W_2 = \ldots\ldots W$$

$$\text{Speed } N = \ldots\ldots \text{rpm}$$

$$S_1 = \ldots\ldots \text{kg}$$

$$S_2 = \ldots\ldots \text{kg}$$

$$\text{Torque } T = (S_1 - S_2) r g = \ldots\ldots \text{Nm}$$

$$\text{O/P power} = \frac{2\pi N T}{60} = \ldots\ldots W$$

$$\text{Power Factor } \cos\phi = \ldots\ldots$$

$$\text{Slip } s = \frac{N_s - N}{N_s} \times 100 = \ldots\ldots \%$$

$$\text{Efficiency } \eta = \frac{O/P}{I/P} \times 100 = \ldots\ldots \%$$

Here r is the radius of the break drum and g is the acceleration due to gravity.

Circuit **Diagram:**

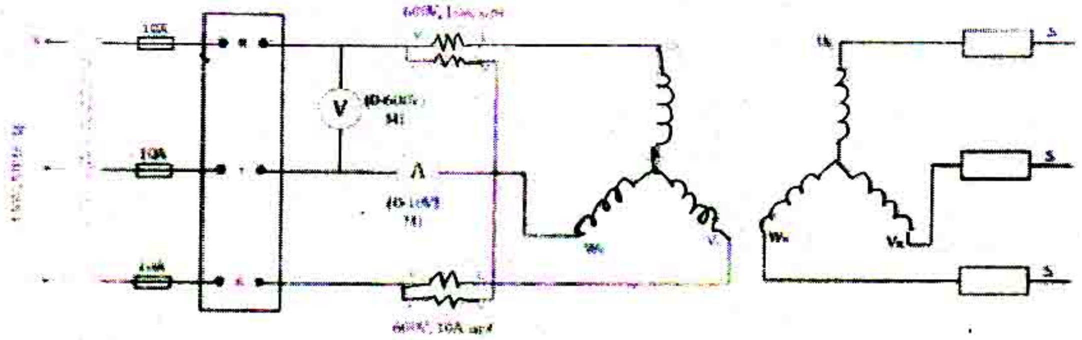


Figure 1: Circuit **diagram** for no-load **test**.

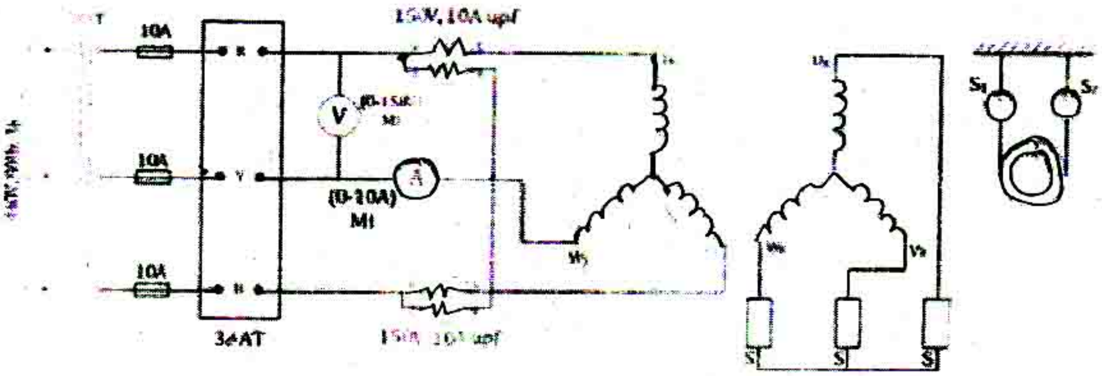


Figure 2: Circuit **diagram** for blocked rotor test.

Observation Table:

No-load test

Sl. No.	V_0 (V)	I_0 (A)	W_1 (W)	W_2 (W)	W_0 (W)
1					
2					
3					
4					
5					
6					

Blocked rotor test

Sl. No.	V_{sc} (V)	I_{sc} (A)	W_1 (W)	W_2 (W)	W_{sc} (W)
1					
2					
3					
4					
5					
6					

Equations and Calculations:

From no-load test

$$\text{Supply voltage } V_0 = \ldots\ldots V$$
$$\text{Circuit current } I_0 = \ldots\ldots A$$
$$\text{No-load power } W_0 = W_1 + W_2 \ldots\ldots W$$
$$\cos\phi_0 = \frac{W_0}{\sqrt{3}V_0 I_0} = \ldots\ldots$$
$$\text{Magnetising current } I_\mu = I_0 \sin\phi_0 = \ldots\ldots A$$
$$\text{Working current } I_w = I_0 \cos\phi_0 = \ldots\ldots A$$
$$R_0 = \frac{V_0}{I_w} = \ldots\ldots\Omega$$
$$X_0 = \frac{V_0}{I_\mu} = \ldots\ldots\Omega$$

From blocked rotor test

$$\text{Supply Voltage } V_{sc} = \ldots\ldots V$$
$$\text{Circuit current } I_{sc} = \ldots\ldots A$$
$$\text{Power consumed } W_{sc} = W_1 + W_2 = \ldots\ldots W$$
$$Z_{01} = \frac{V_{sc}}{I_{sc}} = \ldots\ldots\Omega$$
$$R_{01} = \frac{W_{sc}}{3I_{sc}^2} = \ldots\ldots\Omega$$
$$X_{01} = \sqrt{Z_{01}^2 - R_{01}^2} = \ldots\ldots\Omega$$

Experiment No.: 3

LOAD TEST ON SINGLE PHASE INDUCTION MOTOR

Aim:

To conduct load test on a single phase induction motor and to plot the following charac-teristics.

Precautions:

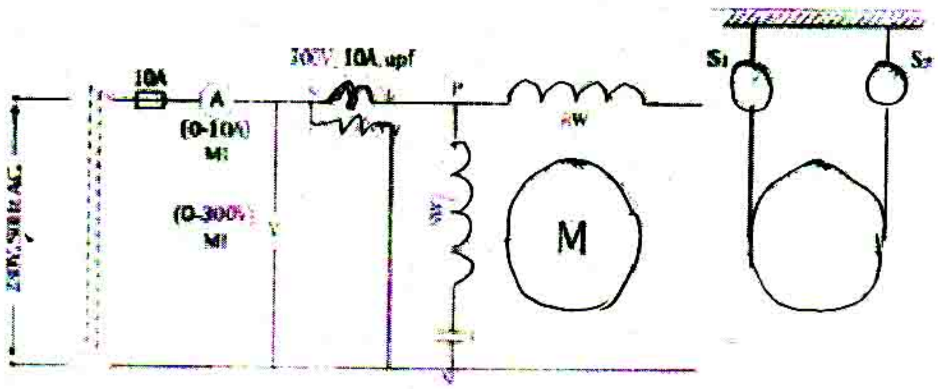
1. All the connections should be tight.
2. The motor should not be on load while starting.

Procedure:

1. Close DPST and start the motor on no load at rated voltage
.2. Note down all the meter readings at no load.
3. Gradually apply the load in steps till the ammeter reads rated current. Note downall the meter readings for each load.
4. Gradually decrease the load to zero and switch off the supply.

Circuit Diagram:

Circuit Diagram:



Observation Table:

Sl. No.	V_1 (V)	A_1 (A)	W_1 (W)	N (rpm)	S_1 (kg)	S_2 (kg)	T (Nm)	o/p (W)	cos ϕ	η
1										
2										
3										
4										
5										
6										

Equations and Calculations:

Voltage V = ... V

Current I = ... A

I/P power = W_1 = ... W

Speed N = ... rpm

S_1 = ... kg

S_2 = ... kg

Torque $T = (S_1 - S_2)rg$ = ... Nm

$$\text{O/P power} = \frac{2\pi NT}{60} = \ldots\ldots \text{ W}$$

Power Factor $\cos\phi$ = ...

$$\text{Efficiency } \eta = \frac{\text{O/P}}{\text{I/P}} \times 100 = \ldots\ldots \%$$

Here r is the radius of the break drum and g is the acceleration due to gravity.

Result:

Experiment No.: 4

AIM:

The aim of the experiment is to predetermine the regulation of three phase alternator byZPF and ASA methods.

APPARATUS REQUIRED:

S.NO	NAME OF THE APPARATUS	RANGE	TYPE	QUANTITY
1.	Ammeter	(0-2)A	MC	1
2.	Ammeter	(0-10)A	MC	1
3.	Ammeter	(0-10)A	MC	1
4.	Ammeter	(0-10)A	MI	1
5.	Voltmeter	(0-600)V	MI	1
6.	Voltmeter	(0-75)V	MC	1
7.	Rheostat	370Ω,1.5A	Wire wound	1
8.	Rheostat	270Ω,1.5A	Wire wound	1
9.	Rheostat	1000Ω,1A	Wire wound	1
10	Inductive load	3 phase	-	1
11.	Tachometer	-	Digital	1
12.	Connecting wires	-	-	As required

FORMULA USED:

1. Percentage regulation = Eo – Vrated / Vrated *100

(For both ZPF and ASA method)

THEORY:

ZERO POWER FACTOR METHOD:

ZPF method is based on the separation of armature leakage reactance and armaturereaction effects. To determine armature leakage reactance and armature reaction mmf separately, two tests are performed on the alternator. The two tests are1. Open circuit test2. Short circuit test3. Zero power factor tests

PROCEDURE TO DRAW THE POTIER TRIANGLE: (ZPF METHOD)

1.Draw the open circuit characteristics curve (Generated voltage per phase Vs fieldcurrent)

2.Mark the point A at X axis, which is obtained from short circuit test with full loadarmature current.

3.From the ZPF test, mark the point B for the field current to the corresponding ratedarmature current and the rated voltage.

4.Draw the ZPF curve which is passing through the point A and B in such a way parallel to the open circuit characteristic curve.

5.Draw the tangent for the OCC from the origin (Air gap line).

6.Draw the line BC from B towards Y axis which is parallel and equal to OA.

7.Draw the parallel line for the tangent from c to the OCC curve.

8.Join the point B and D also draws a perpendicular line DE to BC.DE = Armature leakage reactance drop

BC=Armature reaction excitation

RESULT:

TABULAR COLUMN:

OPEN CIRCUIT TEST:

S.NO	Field Current (If) (amps)	Open Circuit Voltage(V_{OL}) (volts)	Open Circuit Phase Voltage (Voph) (volts)

SHORT CIRCUIT TEST:

S.NO	Field Current (If) (amps)	Short Circuit Current (120 to 150%of rated current) (Isc) (amps)

ZERO POWER FACTOR TEST:

S.NO	Field current (If) (amps)	Rated armature current (Ia) (amps)	Rated armature Voltage (V) (volts)	W_1 Obs Act (watts)	W_2 Obs Act (watts)	Total power (W_1+W_2) (watts)

ARMATURE RESISTANCE Ra:

S.NO	Armature Current (I) (amps)	Armature Voltage(V) (volts)	Armature Resistance Ra= V/I ohm

Experiment No.: 5

AIM:

To study the synchronizing of an alternator with bus bars.

APPARATUS:

1)Thyristor Rectifiers -2

2)Voltmeters -2 No

.3)3 lamp sets

MACHINE SPECIFICATION:

3.5 KVA, 415V, 4.2A, 1500R.P.M., 3-Φ alternator.

THEORY:

The operation of connecting alternator in loads with another alternator or withcommon bus bar is known as synchronizing.For proper synchronizing of alternator the following three conditions must be satisfied.

1)The terminal voltage of the incoming machine must be same as bus bar voltage.

2)The speed of the incoming machine must be same as its frequency must be sameas bus bar frequency.

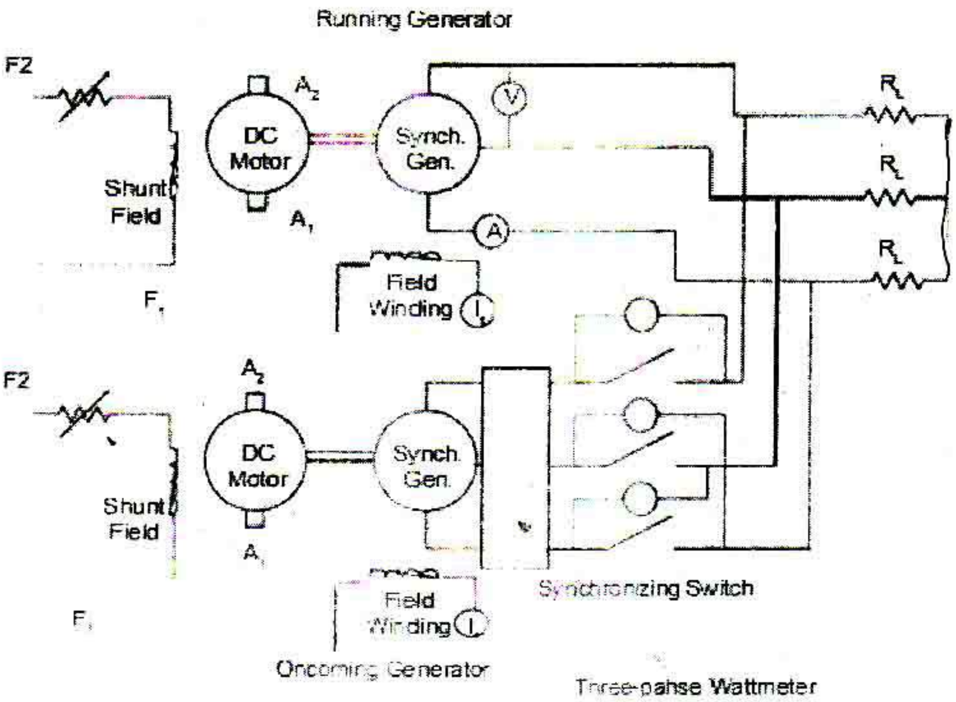
3)The phase of the alternator voltage must be identical with the phase of the bus bar voltage. It means that the switch must be closed at the instant the two voltagehave common phase relationship. However, it is necessary, that the incomingalternator should have the same phase sequence.In this method, three lamps are used. The transposition of two lamps as suggested by Siemens helps us to ascertain whether the incoming machine is running tooslow or too fast. If lamps are connected symmetrically then they would dark off and glow up simultaneously.Lamp L1 is connected between R&R', L2 is between Y&B' and L3betweenY'&B'

If incoming alternator is running faster then bus bar alternator then the voltagestar R'Y'B' will appear to rotate anti-clockwise w.r.t. the bus bar star voltage RYB atspeed corresponding to the difference of frequencies between machine frequency andthe bus bar frequency as shown in figure. If the incoming machine is faster then voltageacross 1 is RR 1 and is seen to be increasing while the voltage across Y1 B is seen to beincreasing while the voltage across Y&B' decreases. Reverse thing happens if theincoming machine is slower.There are three methods of synchronizing the alternator

1)Dark lamp method: Suppose m/c-2 is to be synchronized with the bus bars to which m/c is alreadyconnected. This is done with the help of two lamps L1and L2 connected as shown infig.It should be noted E1and E2 are in phase relative the external ckt. and are in direct phase opposition in no-load ckt.If the frequency of the two alternators is different there will be a phase difference between voltages. This phase diff. continuously changes with the change in their frequency.Here in this method the lamps will glow and become dark time to time and thefrequency of flicker will depend upon relative difference of frequency between thetwo. Darkness indicates two voltages are in exact phase- opposition. Synchronizing isdone at the middle of the dark period

2)One dark and two bright lamp method. In a three phase alternator it is necessary to synchronizing only one phase two phasescoil can be synchronized automatically earlier in the order 3.2.1...3,2,1. etc. which is just after the another reverse. at the first synchronizing, is done at the moment the unglowed lamp L1 is in the middle of the dark period.It will be noticed that when the uncrossed lamp L1 is dark the other two voltage lampsL2 &L3 are equally bright. Hence, this method also known as-two bright and one dark lamp method.

3)Synchroscope method :To eliminate the scheme of (parallel) personal judgment in routine operation of alternators, the machine are synchronized by synchroscope. It consists of threestationary coils and rotating iron valve which is attached to a pointer. Out of threecoils a pair is connected to bus-bars and other to the corresponding m/c terminals.Potential transformer are generally used in case of high voltage machines. The pointer moves to one side or the other depending on whether the incoming machineis faster or slower. For correct speed the pointer points vertically up



PROCEDURE:

- Connect the ckt. as shown in ckt. diagram. Connect respective phase in sequentialorder.
- Give excitation to the alternator and adjust the value to that of bus bar voltage
- Adjust the speed of the alternator such that frequency is 50 Hz.

有 Adjust the speed of the alternator such that the lampL1 is dark while the other twolamps L2 and L3are equally bright.

有Close the switch 's' and synchronize the m/c without jerk.

CONCLUSION:

We can conclude that by using three methods mentioned above we cansynchronize an incoming alternator to the bus-bars keeping in mind the necessary precautions.

Experiment No.: 6

AIM:

The aim of the experiment is to draw the V and inverted V curves of three phasesynchronous motor.

APPARATUS REQUIRED:

S.NO	NAME OF THE APPARATUS	RANGE	TYPE	QUANTITY
1.	Ammeter	(0-10) A	MI	1
2.	Ammeter	(0-2) A	MC	1
3.	Voltmeter	(0-600) V	MI	1
4.	Wattmeter	500V,10 A	Double element	1
5.	Rheostat	500Ω,1.2 A	Wire wound	2
6	Tachometer		Digital	1
7.	3 Φ Auto transformer	415/(0-470)V		1
8.	Connecting wires			As required

THEORY:

Synchronous motor is constant speed motor which are not self starting in nature, sothat we have to start this motor by any one of the following starting methods

,1.Pony motor method starting

2.Auto induction starting

3.DC exciter starting

4.Damper winding method of startingBy construction there is no difference between synchronous generator andsynchronous motor. It is capable of being operated under wide range of power factor,hence it can be used for power factor correction.The value of excitation for which back emf is equal to applied voltage is known as1005 excitation. The other two possible excitations are over excitations and under excitation if the back emf is more or less to the applied voltage respectively.The variations of armature current with field current are in the form of V curvesand the variation of power factor with field current are in the form of Inverted Vcurves.

PRECAUTIONS:

1.The potential divider should be in the maximum position

.2.The motor should be started without any load.

3.Initially TPST switch is in open position.

PROCEDURE:

1.Note down the name plate details of motor

.2.Connections are given as per the circuit diagram.

3.Close the TPST switch.

4.By adjusting the auto transformer from minimum position to maximum position therated supply is given to the motor. The motor starts as an induction motor.

5.In order to give the excitation to the field foe making it to run as the synchronousmotor close the DPST switch

.6. By varying the field rheostat note down the excitation current, armature current andthe power factor for various values of excitation.

7.The same procedure has to be repeated for loaded condition.8.Later the motor is switched off and the graph is drawn

GRAPH:

The graph is drawn for 1.Armature current Vs Excitation current
2.Power Factor Vs Excitation current

TABULAR COLUMN:

Armature voltage:

Without load:

S.no	Excitation current (If) (Amps)	Armature current (Ia) (Amps)	Power factor (CosΦ)

Experiment No.: 7

AIM

The aim of the experiment is to predetermine the regulation of three phase salient polealternator by conducting the slip test

APPARATUS REQUIRED:

S.NO	NAME OF THE APPARATUS	RANGE	TYPE	QUANTITY
1.	Ammeter	(0-5) A	MI	1
2.	Ammeter	(0-5) A	MC	1
3.	Voltmeter	(0-150) V	MI	1
4.	Voltmeter	(0-150)V	MC	1
5.	Rheostat	300Ω,1.5A	Wire wound	1
6.	3 Φ Auto transformer			1
7.	Tachometer			1
8.	Connecting wires			As required

FORMULA USED:

1. Armature Resistance $R_a = 1.6 * R_{dc}$
2. Direct impedance per phase $(Z_d) = V_{min} / I_{max}$ in Ω
3. Quadrature axis impedance per phase $(Z_q) = V_{max} / I_{min}$ in Ω
4. Direct axis reactance per phase $(X_d) = \sqrt{Z_d^2 - R_a^2}$ in Ω
5. Quadrature axis reactance per phase $(X_q) = \sqrt{Z_q^2 - R_a^2}$ in Ω
6. Percentage Regulation = $E_o - V_{rated} / V_{rated} * 100$
7. $E_o = V_t \cos\delta - I_q R_a - I_d X_d$ (Motoring)
8. $E_o = V_t \cos\delta + I_q R_a + I_d X_d$ (Generating)
9. $\delta = \Psi - \Phi$ (Generator)
10. $\delta = \Phi - \Psi$ (Motor)
11. $\Psi = \tan^{-1} (V_t \sin\Phi \pm I_a X_q / V_t \cos\Phi \pm I_a R_a)$ + For generating mode – For Motoring mode

THEORY:

In non salient pole alternators air gap length is constant and reactance is also constant.Due to this the mmfs of armature and field act upon the same magnetic circuit all the timehence can be added vector ally. But in salient pole alternators the length of the air gap variesand reluctance also varies. Hence the armature flux and field flux cannot vary sinusoid ally inthe air gap. So the, reluctance of the magnetic circuit on which mmf act is different in case of salient pole alternators. This can be explained by two reaction theory

PRECAUTIONS:

1. The motor field rheostat should be kept in minimum resistance position
2. The alternator field should be kept open throughout the experiment.
3. The direction of rotation due to prime mover and due to the alternator run as themotor should be same.

4.Initially all the switches are kept open.

PROCEDURE:

1.Note down the name plate details of motor and alternator

.2.Connections are given as per the circuit diagram

.3.Give the supply by closing the DPST switch

.4.Using the three point starter start the motor to run at the synchronous speed byvarying the motor field rheostat at the same time check whether the alternator fieldhas opened or not

.5.Apply 20% to 30% of the rated voltage to the armature of the alternator byadjusting the autotransformer

.6.To obtain the slip and maximum oscillations of pointers, the speed is reducedslightly lesser than the synchronous speed

.7.Maximum current, minimum current, maximum voltage and Minimum voltage arenoted.

8.Find out the direct and quadrature axis impedance (Zd,Zq).

RESULT:

TABULAR COLUMN:TO FIND OUT THE DIRECT AXIS IMPEDANCE (Zd) :Speed of the alternator: Minimum Voltage applied to the stator:(Nearly 20% to 30% of rated voltage)

S.NO	Minimum current per phase (Imin) (amps)	Maximum Voltage per phase (Vmax) (volts)	Direct axis impedance per phase (Zd) (Ohms)	Direct axis Reactance per phase (Xd) (Ohms)

TO FIND OUT THE QUADRATURE AXIS IMPEDANCE (Zq) :

S.NO	Maximum current per phase (Imax) (amps)	MinimumVoltage per phase (Vmin) (volts)	Quadrature axisimpedance per phase (Zd) (Ohms)	Quadrature axis Reactance per phase (Xd) (Ohms)

Experiment No.: 8

AIM:

The aim of the experiment is to conduct the no load and blocked rotor test on single phase induction motor and to draw the equivalent circuit

APPARATUS REQUIRED:

S.NO	NAME OF THE APPARATUS	RANGE	TYPE	QUANTITY
1.	Ammeter	(0-10) A	MI	1
2.	Ammeter	(0-10) A	MC	1
3.	Ammeter	(0-10) A	MI	1
4.	Voltmeter	(0-300) V	MI	1
5.	Voltmeter	(0-150) V	MI	1
6.	Voltmeter	(0-75) V	MC	1
7.	Wattmeter	300V,10 A	LPF	1
8.	Wattmeter	150V, 10 A	UPF	1
9.	Tachometer	-	Digital	1
10.	1Φ Auto transformer	230/(0-270) V		1
	Connecting wires	-		As required

FORMULA USED:

NO LOAD TEST:

1.No load power factor ($Cos\Phi_0$) = $W_0 / V_0 I_0$

Where W_0= No load power in watts V_0 = No load voltage in volts. I_0 – No load current in amps

2.Working component current (Iw) = $I_0 Cos\Phi_0$ amps

3.Magnetizing component current (Im) = $I_0 Sin\Phi_0$ amps

4. No load resistance R_0 = V/ Iw ohm

5.No load reactance X_0 = V_0/ Im ohm

BLOCKED ROTOR TEST:

6. Motor equivalent impedance referred to stator Zsc = (Vsc / Isc) ohm

7. Motor equivalent resistance referred to stator Rsc = Zsc CosΦsc ohm= Wsc / Isc^2 ohm

8. Power factor CosΦsc – Wsc / VscIsc

9. Motor equivalent reactance referred to stator Xsc = √(Zsc^2 – Rsc^2) ohm

10.Rotor resistance referred to stator R_2' = Rsc – R_1 ohm

11.Rotor reactance referred to stator X_2' = Xsc / 2 = X_1 [illegible] Where R = Rac = 1.6 *Rdc R_1 = stator resistance X_1 = stator reactance

12. Magnetizing reactance Xm = 2(X_0 – X_1 – X_2'/2)

13.Slip = (Ns-N)/Ns Ns = synchronous speed in rpm N = speed of the motor in rpm

THEORY:

The equivalent circuit of a single phase induction motor can be developed by usingdouble field revolving theory. By using the equivalent circuit the performance of the single phase induction motor can be obtained.The single phase induction motor can be visualized to be made of single stator winding and two imaginary rotors. The developing torques of the induction motor is forwardtorque and backward torque.When the single phase induction motor is running in the direction of forwardrevolving field at a slip S, then the rotor currents induced by the forward field has frequencysf. The rotor mmf rotates at slip speed with respect to the rotor but at synchronous speed withrespect to the stator. The resultant forward stator flux and the rotor flux produce a forward air gap flux. This flux induces the voltage in rotor. Thus due to the forward flux, the rotor circuitreferred to stator has an impedance of R 2 ' /2s + jX2'/2.The backward flux induces a current in the rotor at a frequency (2-s)f. thecorresponding rotor mmf rotates in the air gap at synchronous speed in the backwarddirection. The resultant backward stator flux and the rotor flux produce a backward air gapflux. This flux induces the voltage in rotor. Thus due to backward flux the rotor circuitreffered to stator has an impedance of R 2'/2(2-s)+ jX2'/2

NO LOAD TEST OR OPEN CIRCUIT TEST:

No load test is performed to determine the no load current, no load power factor, windage and friction losses, no load input and no load resistance and reactance.Since there is no power output on no load, the power supplied to the stator furnishes itscore loss and the friction and wind age losses in the rotor.

BLOCKED ROTOR TEST OR SHORT CIRCUIT TEST:

It is also known as locked rotor or short circuit test. This test is used to find the short circuitcurrent with normal voltage applied to stator, power factor on short circuit, total leakage reactance andresistance of the motor as referred to stator and full load copper loss.

PRECAUTIONS:

1.The auto transformer should be kept at minimum voltage position.

PROCEDURE:

1.Connections are made as per the circuit diagram.

2.For no load test by adjusting autotransformer apply rated voltage and note down the ammeter,voltmeter and wattmeter readings. In this test the rotor is free to rotate

.3.For blocked rotor test by adjusting autotransformer apply rated current and note down theammeter, voltmeter and wattmeter readings. In this test the rotor is blocked.

4.After that make the connections to measure the stator resistance as per the circuit diagram

.5.By adding the load through the loading rheostat note down the ammeter, voltmeter readingsfor various values of load.

RESULT:

4/7/19

TABULAR COLUMN:

NO LOAD TEST:

Speed of the induction motor:

Multiplication Factor:

S.no	No load current (Io)	No Load Voltage (Vo)	No load Power W_1	W_2	Total No load Power W_1+W_2
	(Amps)	(Volts)	(Watts)		(Watts)

BLOCKED ROTOR TEST:

Speed of the induction motor:

Multiplication Factor:

S.no	Short circuit current (Isc)	Short circuit Voltage (Vsc)	Short circuit Power W_1	W_2	Total Power W_1+W_2
	(Amps)	(Volts)	(Watts)		(Watts)

ARMATURE RESISTANCE Ra:

S.NO	Armature Current (I) (amps)	Armature Voltage(V) (volts)	Armature Resistance Ra= V/I ohm