Programme Outcomes (POs) to be achieved through Practical of this course

PO 1- **Basic knowledge**: Apply knowledge of basic mathematics, sciences and basic engineering to solve the broad-based Electrical engineering problems.

PO 2- **Discipline knowledge**: Apply Electrical engineering knowledge to solve broad-based electrical engineering related problems.

PO 3- **Experiments and practice**: Plan to perform experiments and practices to use the results to solve broad-based Electrical engineering problems.

PO 4 - **Engineering tools**: Apply relevant Electrical technologies and tools with an understanding of the limitations.

PO 5- **The engineer and society**: Assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to practice in the field of Electrical engineering.

PO 6- **Environment and sustainability**: Apply Electrical engineering solutions also for sustainable development practices in societal and environmental contexts.

PO 7- **Ethics**: Apply ethical principles for commitment to professional ethics, responsibilities and norms of the practice also in the field of Electrical engineering.

PO 8-**Individual and team work**: Function effectively as a leader and team member in diverse/multidisciplinary teams.

PO 9 - **Communication:** Communicate effectively in oral and written form.

PO 10- **Life-long learning**: Engage in independent and life-long learning activities **i**n the context of technological changes also in the Electrical engineering and allied industry.

PSO 1 - Electrical Equipment: Maintain various types of rotating and static electrical equipment.

PSO 2- Electric Power Systems: Maintain different types of electrical power systems.

Course outcomes (COs)

a. Check the broad based working of various types of boilers and steam turbines.

b. Check the broad bused working of diesel engines and gas turbines.

c. check the broad based working of turbines and pumps

d. check the broad based working of air compressor.

e. check the broad based working of refrigeration and air-conditioning systems.

Sr. No.	Practical Outcomes	CO1	CO2	CO3	CO4	CO5
1	Identify the components of steam boilers model.	√				
2	Identify the components of impulse and reaction turbine models.		√			
3	Assemble / dismantle impulse turbine models & reaction turbine model			√		
4	Identify the components and Assemble / dismantle gas turbine models			√		
5	Identify the components of four stroke diesel engine model.		√			
6	Assemble /Dismantle micro peloton turbine and micro Francis turbine.			√		
7	Perform test on centrifugal pump to calculate overall efficiency			√		
8	Assemble / Dismantle reciprocating air compressor, screw compressor and centrifugal compressor				√	
9	Identify the components of refrigeration system (VCC)					√
10	Identify the components of air conditioning system (VCC)					√

List of Practicals and Progressive Assessment Sheet

S.No.	Practical outcomes	Page no.	Date of Performance	Date of submission	Assessment marks	Dated sign of teacher	Remark
1	Identify the components of steam boilers model.	4					
2	Identify the components of impulse and reaction turbine models.	11					
3	Assemble / dismantle impulse turbine models & reaction turbine model	17					
4	Identify the components and Assemble / dismantle gas turbine models.	23					
5	Identify the components of four stroke diesel engine model.	29					
6	Assemble /Dismantle micro peloton turbine and micro Francis turbine.	35					
7	Perform test on centrifugal pump to calculate overall efficiency	40					
8	Assemble / Dismantle reciprocating air compressor, screw compressor and centrifugal compressor	46					
9	Identify the components of refrigeration system (VCC)	52					
10	Identify the components of air conditioning system (VCC)	59					
	Total						

EXPERIMENT NO – 1

Title - Identify the components of steam boilers model.

I. Practical Significance –

Boilers are widely used in various applications in industry viz. thermal power plants, diary, sugar industry , rubber industry, textile industry, to no the working of boilers , students should able to identify the components of steam boiler.

II. Relevant program outcomes (POs)

PO 2- **Discipline knowledge**: Apply Electrical engineering knowledge to solve broad-based electrical engineering related problems.

PO 3- **Experiments and practice**: Plan to perform experiments and practices to use the results to solve broad-based Electrical engineering problems.

PO 8-**Individual and team work**: Function effectively as a leader and team member in diverse/multidisciplinary teams.

III. Competency and Skills

This practical is expected to develop the following skills for the industry identified competency Use principles of thermal engineering to maintain thermal related equipment.

1. Maintain tool and equipment.
2. Practice energy conservation.

IV Relevant Course Outcome (s)

Check the broad based working of various types of boilers and steam turbines.

V Practical Outcome

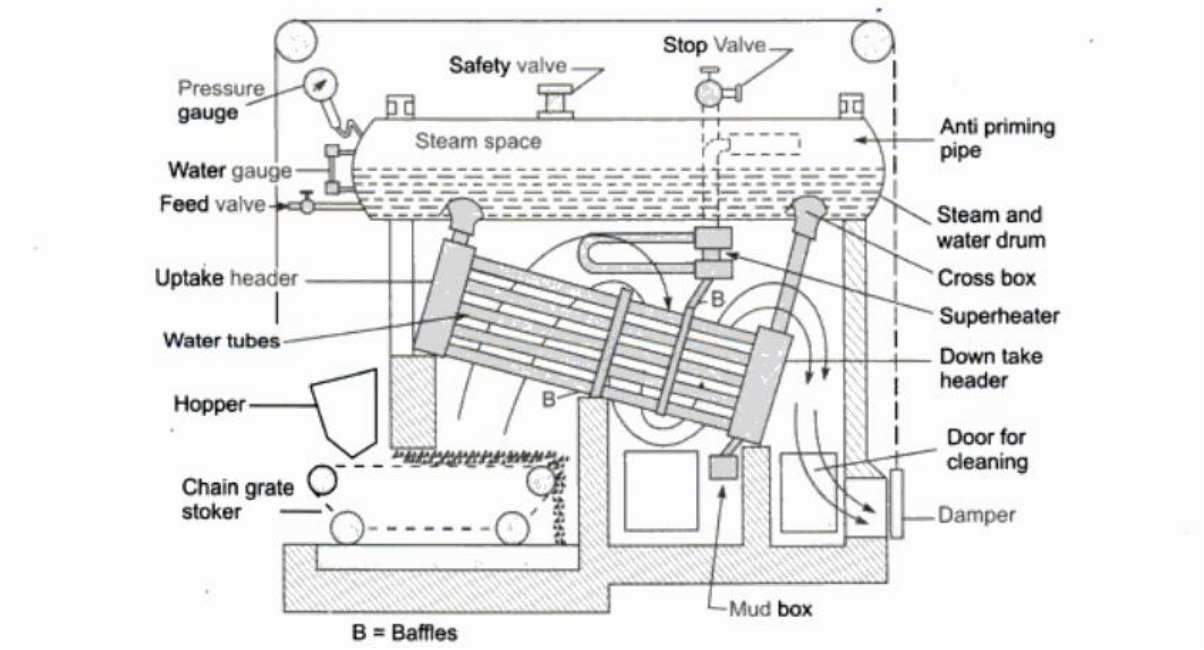
Identify the components of steam boilers model.

VI Minimum Theoretical Background

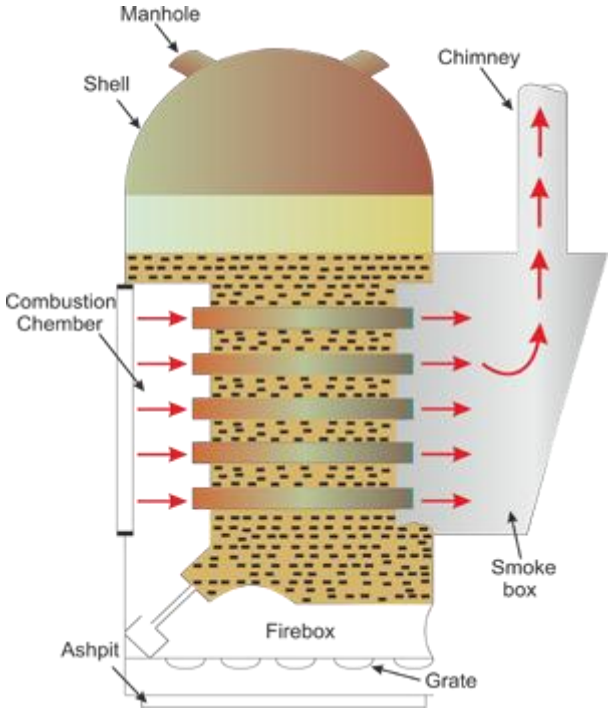
Boiler is the enclosed vessel to generate the steam from the water. The different parts like safety valves, pressure gauge, water gauge etc. are essential parts of boiler. These parts play the important role in generating the steam safely.

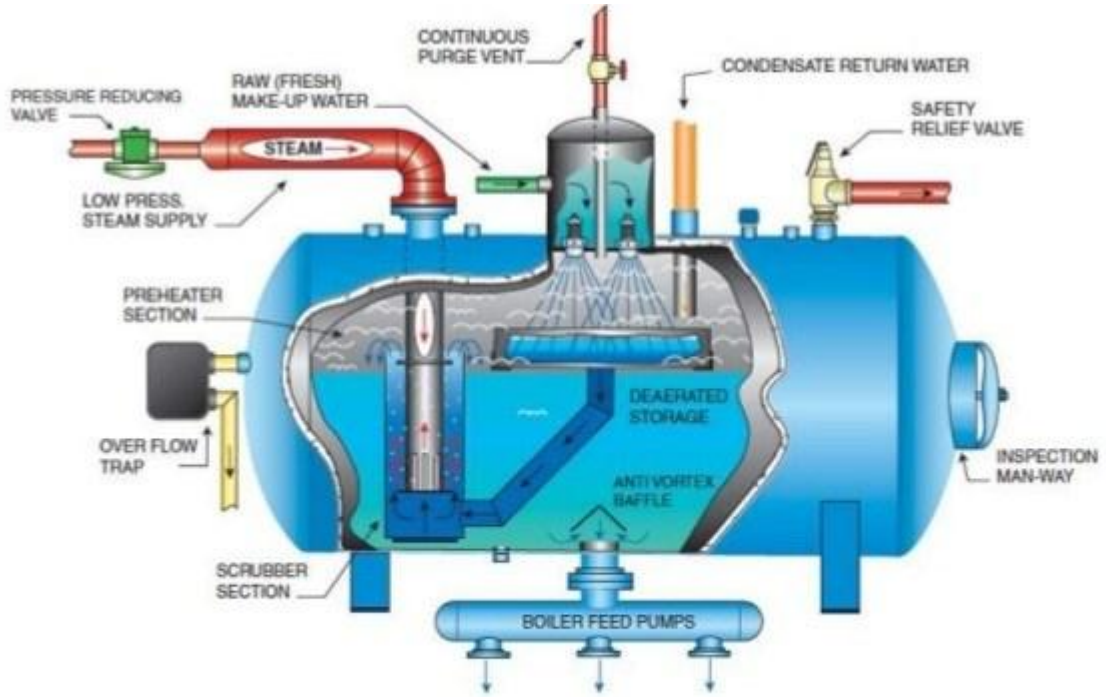
VII Setup (Model

(a) Water tube boiler



(b) Fire tube boiler





STEAM BOILER

VIII Resources Required

Name of boiler	Specification	Qty

IX Precautions to be followed

(i) Use safety shoes
(ii) Do not try to dismantle boiler parts.

X Procedure

(i) Select the particular boiler available in the laboratory.

(ii Understand the functions of different parts.

XI Resources Used

S.r. No	Name of Resource	Broad Specification			Remark (if any)
		Make	Details	Qty	

XII Actual Procedure followed

_____
_____
_____

XIII Precautions followed

_____
_____
_____

XIV Observations and Calculations

Sr.N	Name of the parts of boiler	Location	Function	Qty.

XV Results

_____
_____

XVI Interpretation of Results (Giving meaning to results)

_____
_____
_____

XVII Conclusions (Actions to be taken based on the interpretations)

_____
_____
_____

XVIII- Practical Related Questions

Note- Below given are few sample questions for refrence. Teachers must design more such questions so as to ensure to achievement of identified Cos

Q1 Give classification of boilers

Q2 List the types of water tube boilers

Q2 List the types of fire tube boilers

Q4 Mention the area of application of boilers.

Space for Answers

XIX Assessment Scheme

	Performance Indicators	**Weightage**
	Process Related (10 Marks)	**(40%)**
1	Simulating various parameters within appropriate range satisfactorily	20%
2	Tabulate results independently	20%
3	**Product Related (15 Marks)**	**60%**
4	Interpretation of result	20%
5	Conclusions	20%
6	Practical related questions	20%
	Total(25Marks)	**100%**

Marks obtained			Dated sign. Of Teacher
Process Related(10)	Product Related(15)	Total(25)	

EXPERIMENT NO – 2

Title - Identify the components of impulse and reaction turbine models.

I. Practical Significance –

Steam turbines are employed as the prime movers together with the electric generators in thermal and nuclear power plants to produce electricity. They are also used to propel large ships, ocean liners, submarines and to drive power absorbing machines like large compressors, blowers, fans and pumps.

II. Relevant program outcomes (POs)

PO 2- **Discipline knowledge**: Apply Electrical engineering knowledge to solve broad-based electrical engineering related problems.

PO 3- **Experiments and practice**: Plan to perform experiments and practices to use the results to solve broad-based Electrical engineering problems.

PO 8-**Individual and team work**: Function effectively as a leader and team member in diverse/multidisciplinary teams.

III. Competency and Skills

This practical is expected to develop the following skills for the industry identified competency Use principles of thermal engineering to maintain thermal related equipment.

3. Maintain tool and equipment.
4. Practice energy conservation.

IV Relevant Course Outcome (s)

Check the broad based working of diesel engines and gas turbines.

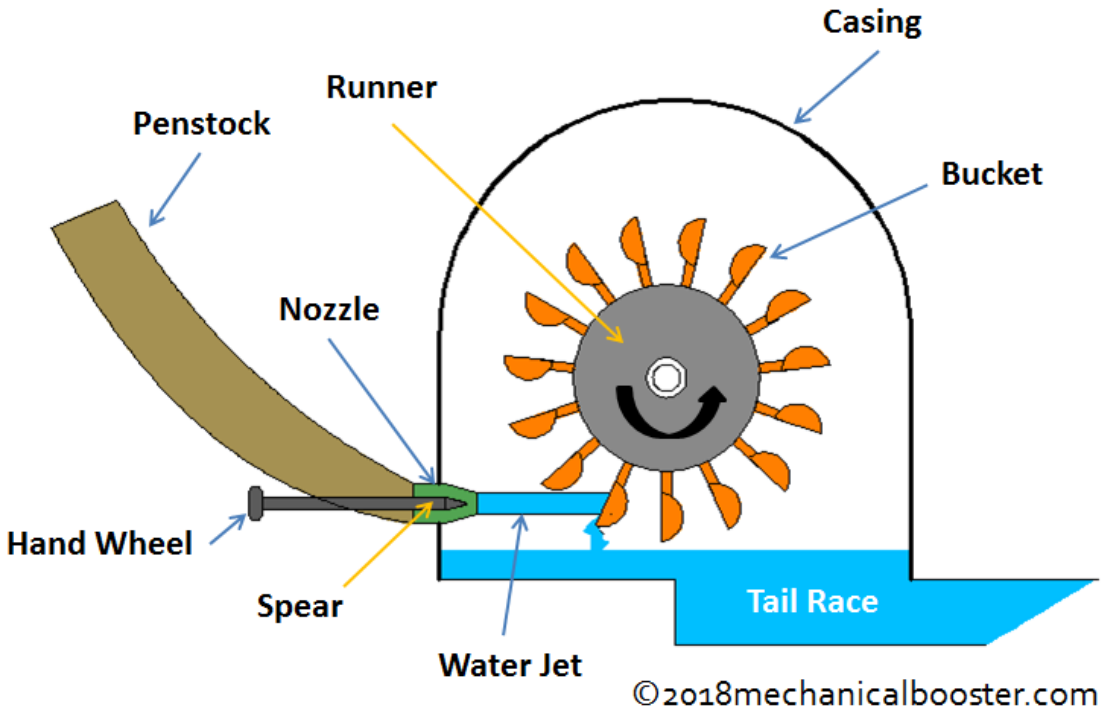
V Practical Outcome

Identify the components of impulse and reaction turbine models.

VI Minimum Theoretical Background

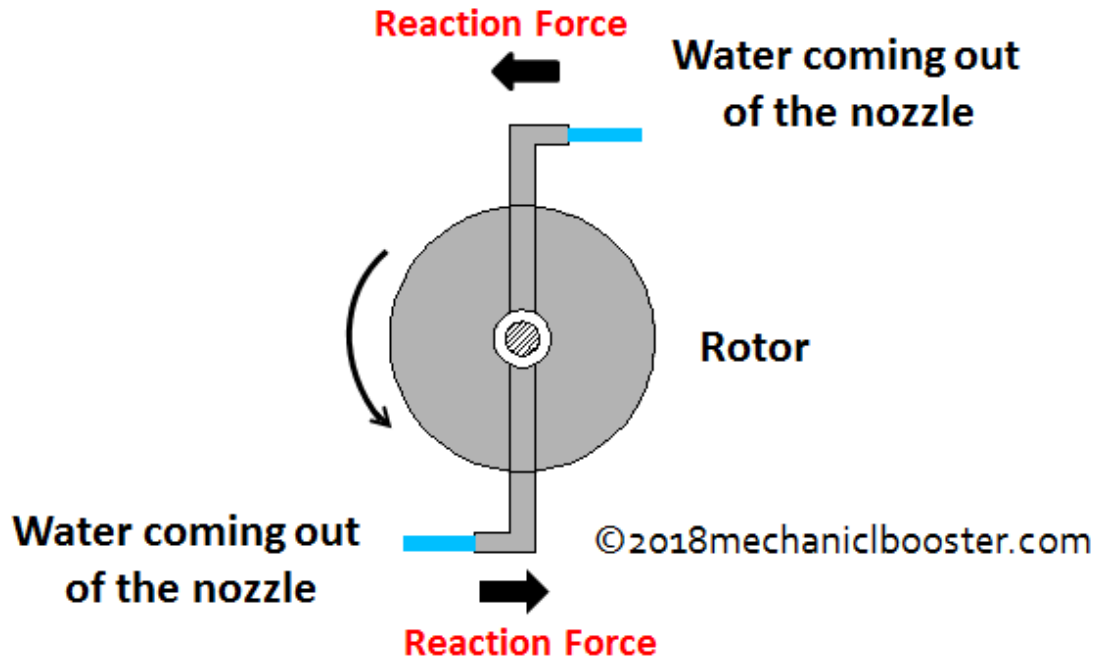
Impulse turbine has nozzles and moving blades. The nozzles are convergent-divergent type while moving blades are symmetrical in shape. Reaction turbine employs aerofill shaped blades. The shapes of fixed as well as moving blades are same

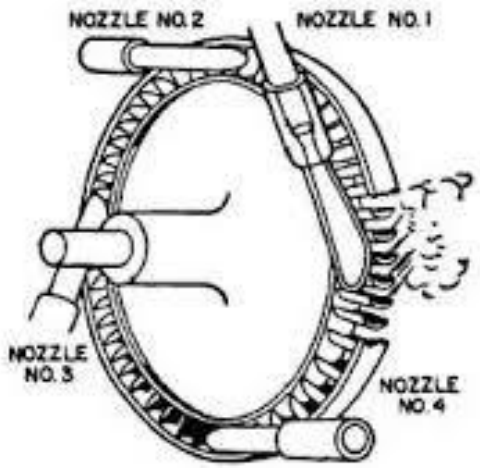
VII Setup (Model)



Main Parts of Impulse Turbine

(c) Reaction Turbine





VIII Resources Required

Name of boiler	Specification	Qty

IX Precautions to be followed

Use safety shoes
Do not try to dismantle boiler parts.

X Procedure to be followed

(i) Select the turbine model for demonstration
(ii) Locate the parts of turbine.
(iii) Discuss the function of each part of turbine with teacher.

XI Resources Used

S.r. No	Name of Resource	Broad Specification			Remark (if any)
		Make	Details	Qty	

XII Actual Procedure followed

XIII Precautions followed

XIV Observations and Calculations

Type of turbine selected- Impulse

S.N	Components	Location	Function	Qty
1				
2				
3				
4				
5				

Type of turbine selected- Reaction

S.N	Components	Location	Function	Qty
1				
2				
3				
4				
5				

XV Results

XVI Interpretation of Results (Giving meaning to results)

XVII Conclusions (Actions to be taken based on the interpretations)

XVII- Practical Related Questions

Note- Below given are few sample questions for reference. Teachers must design more such questions so as to ensure to achievement of identified Cos

Q1 Classify the turbines

Q2List the application of turbine.

Q3 Mention the working principle of impulse turbine

Q4 Differentiate between impulse and reaction turbine.

XIX Assessment Scheme

	Performance Indicators	Weightage
	Process Related (10 Marks)	**(40%)**
1	Simulating various parameters within appropriate range satisfactorily	20%
2	Tabulate results independently	20%
3	**Product Related (15 Marks)**	**60%**
4	Interpretation of result	20%
5	Conclusions	20%
6	Practical related questions	20%
	Total(25Marks)	**100%**

Marks obtained			Dated sign. Of Teacher
Process Related(10)	Product Related(15)	Total(25)	

EXPERIMENT NO – 3

Title - Assemble / dismantle impulse turbine models.& reaction turbine model.

I. Practical Significance –

Steam turbines are employed as the prime movers together with the electric generators in thermal and nuclear power plants to produce electricity. They are also used to propel large ships, ocean liners, submarines and to drive power absorbing machines like large compressors, blowers, fans and pumps.

II. Relevant program outcomes (POs)

PO 2- **Discipline knowledge**: Apply Electrical engineering knowledge to solve broad-based electrical engineering related problems.

PO 3- **Experiments and practice**: Plan to perform experiments and practices to use the results to solve broad-based Electrical engineering problems.

PO 8-**Individual and team work**: Function effectively as a leader and team member in diverse/multidisciplinary teams.

III. Competency and Skills

This practical is expected to develop the following skills for the industry identified competency **Use principles of thermal engineering to maintain thermal related equipment**.

(i) Maintain tool and equipment.

(ii) Practice energy conservation.

IV Relevant Course Outcome (s)

Check the broad based working of diesel engines and gas turbines.

V Practical Outcome

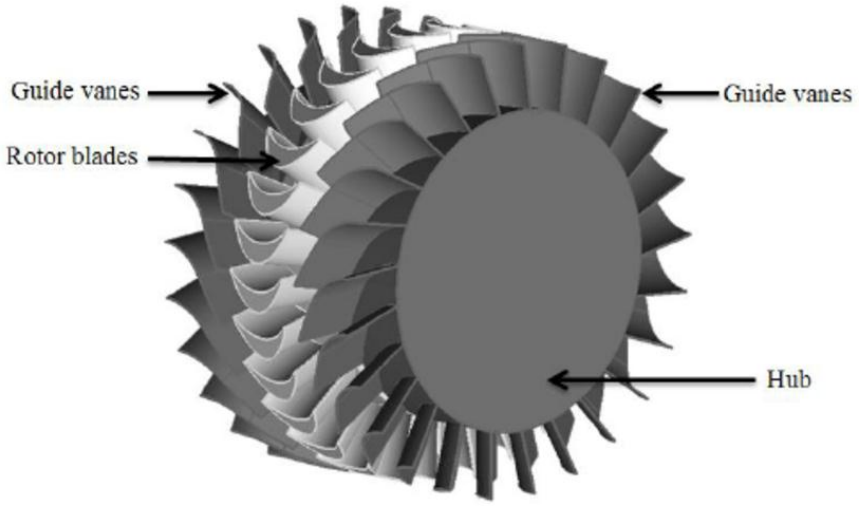
Assemble / dismantle impulse turbine models & reaction turbine model

VI Minimum Theoretical Background

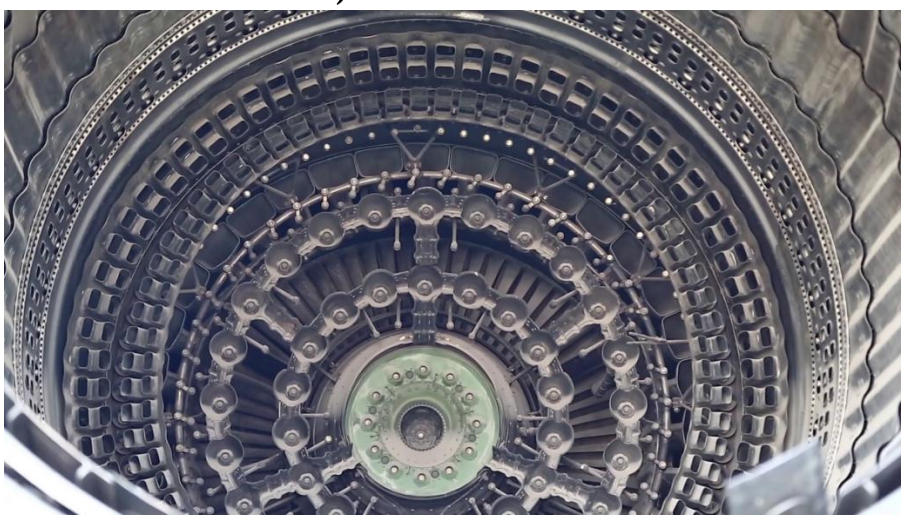
Impulse turbine has nozzles and moving blades. The nozzles are convergent-divergent type while moving blades are symmetrical in shape. Reaction turbine employs aerofill shaped blades. The shapes of fixed as well as moving blades are same

VII Setup (Model)

a)Impulse Turbine



b)Reaction Turbine



VIII Resources Required

Name of boiler	Specification	Qty.

IX Precautions to be followed

Use safety shoes.
Use tools carefully while dismantling the parts.

X Procedure

(i) Select the turbine model for demonstration
(ii) Dismantle the same using suitable tools.
(iii) Locate different damage/failure areas in given turbine
(iv) Locate different components of given turbine.
(v) Assemble the same again.

XI Resources Used

Sr. No.	Name of Resource	Broad Specification			Remark (if any)
		Make	Details	Qty.	

XII Actual Procedure followed

XIII Precautions followed

XIV Observations and Calculations

Type of turbine selected- Impulse

S.N	Components	Type	Material	Tools used	Possible Failure
1	Turbine Blades	Impulse/reaction			Erosion/corrosion
2	Turbine Rotor				
3	Turbine Casing				
4	Turbine Bearing				
5	Turbine Seals				

Type of turbine selected- Reaction

S.N	Components	Type	Material	Tools used	Possible Failure
1	Turbine Blades	Impulse/reaction			Erosion/corrosion
2	Turbine Rotor				
3	Turbine Casing				
4	Turbine Bearing				
5	Turbine Seals				

XV Results

XVI Interpretation of Results (Giving meaning to results)

XVII Conclusions (Actions to be taken based on the interpretations)

XVII- Practical Related Questions

Note- Below given are few sample questions for reference. Teachers must design more such questions so as to ensure to achievement of identified COs

Q1 Collect specification of steam turbines used for different applications

Q2 Draw the sketch of impulse turbine/reaction turbine

Q3 Collect information on steam turbine failure.

XIX Assessment Scheme

	Performance Indicators	**Weightage**
	Process Related (10 Marks)	**(40%)**
1	Simulating various parameters within appropriate range satisfactorily	20%
2	Tabulate results independently	20%
3	**Product Related (15 Marks)**	**60%**
4	Interpretation of result	20%
5	Conclusions	20%
6	Practical related questions	20%
	Total(25Marks)	**100%**

Marks obtained			Dated sign. Of Teacher
Process Related(10)	Product Related(15)	Total(25)	

EXPERIMENT NO – 4

Title - Identify the components and Assemble / dismantle gas turbine models.

Practical Significance

Gas turbines are used in power generating applications such as generation of electric power, to drive air compressors in turbojets, to drive superchargers fitted in the aviation gasoline engines, marine engines etc. To know the working of gas turbines, student should able to identify assemble & dismantle the components of gas turbine.

II Relevant program outcomes (POs)

PO 2- **Discipline knowledge**: Apply Electrical engineering knowledge to solve broad-based electrical engineering related problems.

PO 3- **Experiments and practice**: Plan to perform experiments and practices to use the results to solve broad-based Electrical engineering problems.

PO 8-**Individual and team work**: Function effectively as a leader and team member in diverse/multidisciplinary teams.

III. Competency and Skills

This practical is expected to develop the following skills for the industry identified competency **Use principles of thermal engineering to maintain thermal related equipment**.

(i) Maintain tool and equipment.

(iii) Practice energy conservation.

IV Relevant Course Outcome (s)

Check the broad based working of diesel engines and gas turbines.

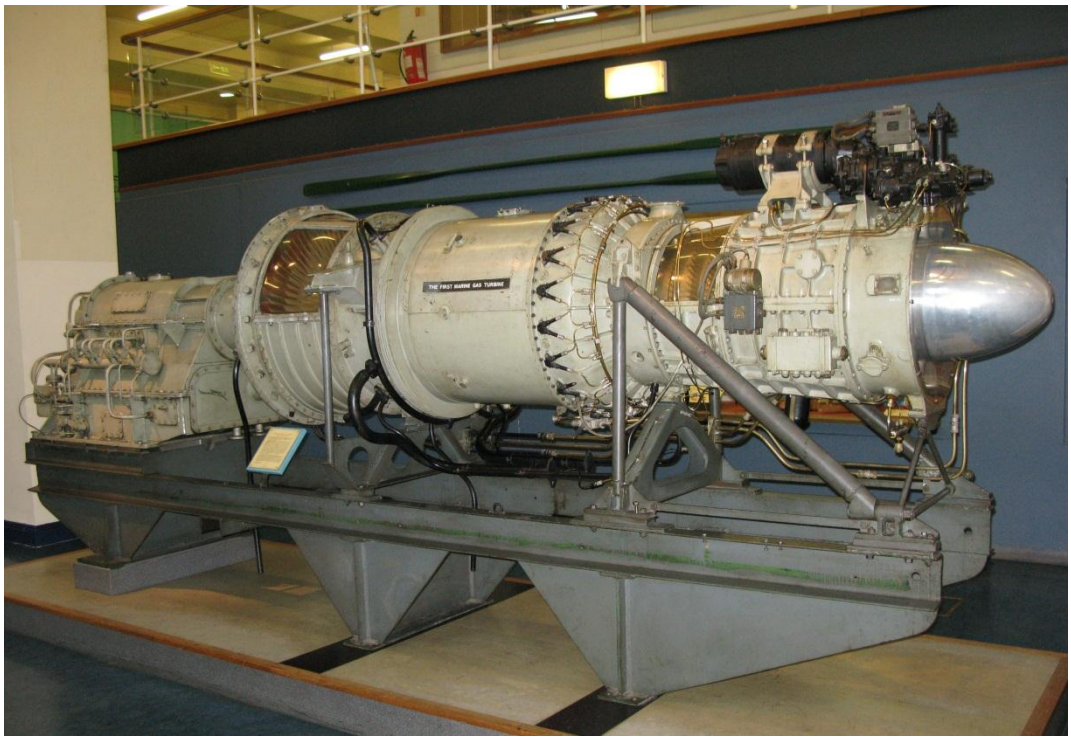
V Practical Outcome

Identify the components and Assemble / dismantle gas turbine models.

VI Minimum Theoretical Background

The air is obtained from atmosphere is compressed in air compressor which is then passed to the combustion chamber where it is heated considerably. The hot air is then made to flow over the moving blades of the gas turbine.

VII Setup (Model)



VIII Resources Required

Name of boiler	Specification	Qty

IX Precautions to be followed

Use safety shoes.

Use tools carefully while dismantling the parts.

X Procedure to be followed

(vi) Select the turbine model for demonstration
(vii) Dismantle the same using suitable tools.
(viii) Locate different damage/failure areas in given turbine
(ix) Locate different components of given turbine.
(x) Assemble the same again.

XI Resources Used

S.r. No	Name of Resource	Broad Specification			Remark (if any)
		Make	Details	Qty.	

XII Actual Procedure followed

XIII Precautions followed

XIV Observations and Calculations

Sr.N	Name of the parts	Location	Function	Qty.

XV Results

XVI Interpretation of Results (Giving meaning to results)

XVII Conclusions (Actions to be taken based on the interpretations)

XVII- Practical Related Questions

Note- Below given are few sample questions for refrence. Teachers must design more such questions so as to ensure to achievement of identified Cos

Q1 Collect specification of gas turbines used for different applications

Q2 Mention the applications of closed cycle turbine and open cycle turbine

Q3 Differentiate between a closed cycle turbine and open cycle turbine

Q4 Draw the schematic arrangement of closed cycle gas turbine

XIX Assessment Scheme

	Performance Indicators	**Weightage**
	Process Related (10 Marks)	**(40%)**
1	Simulating various parameters within appropriate range satisfactorily	20%
2	Tabulate results independently	20%
3	**Product Related (15 Marks)**	**60%**
4	Interpretation of result	20%
5	Conclusions	20%
6	Practical related questions	20%
	Total(25Marks)	**100%**

Marks obtained			Dated sign. Of Teacher
Process Related(10)	Product Related(15)	Total(25)	

EXPERIMENT NO – 5

Title -. Identify the components of four stroke diesel engine model.

Practical Significance

The diesel engines are generally employed in heavy duty vehicles like buses, trucks and earth moving machines. Students are able to know the working of four stoke diesel engine.

II. Relevant program outcomes (POs)

III. Competency and Skills

This practical is expected to develop the following skills for the industry identified competency **Use principles of thermal engineering to maintain thermal related equipment**.

(i) Maintain tool and equipment.

(iv) Practice energy conservation.

IV Relevant Course Outcome (s)

Check the broad based working of diesel engines and gas turbines.

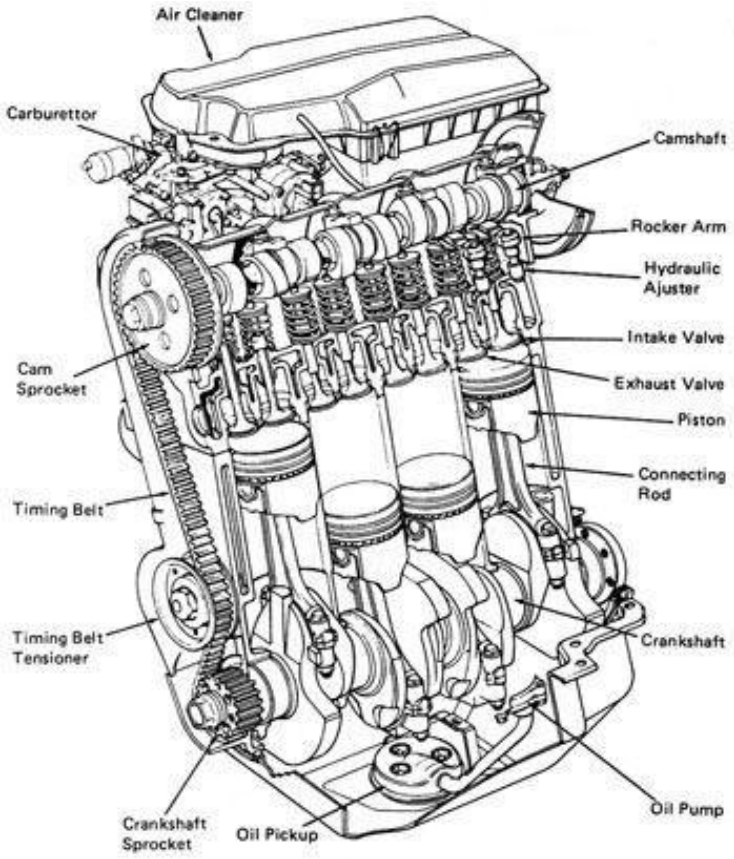
V Practical Outcome

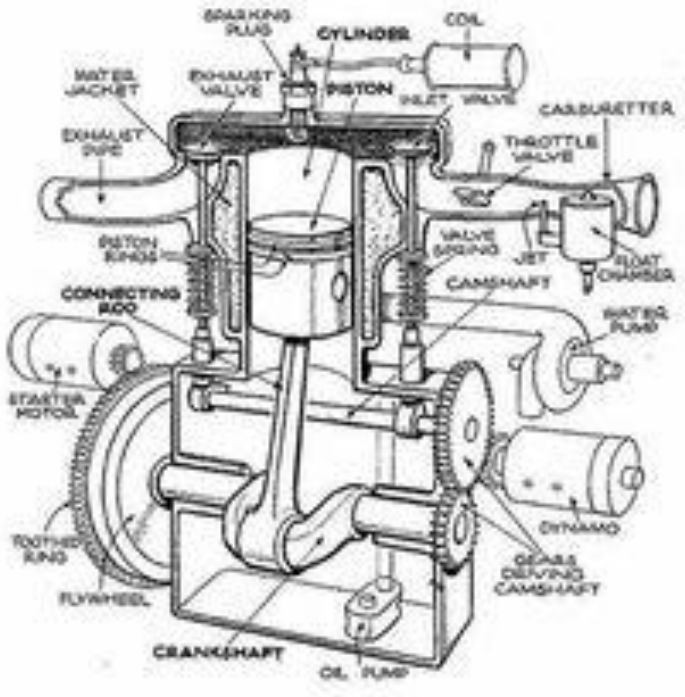
Identify the components of four stroke diesel engine model.

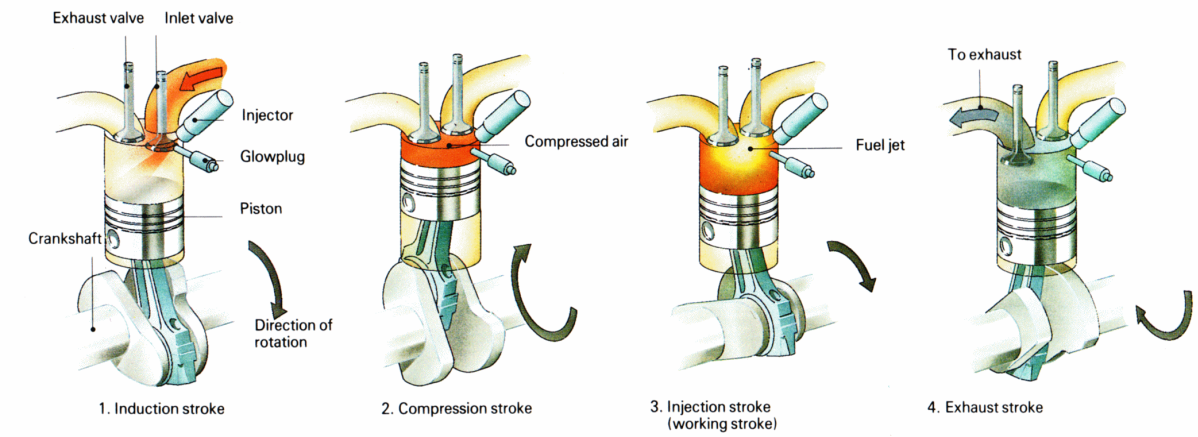
VI Minimum Theoretical Background

Four stroke diesel engine requires four strokes of the piston to complete one cycle of operation in the engine cylinder. Four strokes are suction suction, compression ,expansion and exhaust stoke.

VII Setup (Model)







VIII Resources Required

Name of Engine	Specification	Qty.

IX Precautions

(i)Use safety shoes.
(ii) Maintain tools and equipment.

X Procedure

(i) Select the four stroke diesel engine model for demonstration.
(ii) Locate the different parts.
(iii) Discuss the function of different components of available engine.

XI Resources Used

Sr. No.	Name of Resource	Broad Specification			Remark (if any)
		Make	Details	Qty.	

XII Actual Procedure followed

XIII Precautions followed

XIV Observations and Calculations

Sr.N	Name of the parts	Location	Function	Qty.

XV Results

XVI Interpretation of Results (Giving meaning to results)

XVII Conclusions (Actions to be taken based on the interpretations)

XVII- Practical Related Questions

Note- Below given are few sample questions for reference. Teachers must design more such questions so as to ensure to achievement of identified Cos

Q1 Discuss the working of four stroke diesel engine

Q2 State applications of diesel engine

Q3 Differentiate between 2 stroke and 4stroke engine

Q4 List benefits of 4 stroke engine.

XIX Assessment Scheme

	Performance Indicators	**Weightage**
	Process Related (10 Marks)	**(40%)**
1	Simulating various parameters within appropriate range satisfactorily	20%
2	Tabulate results independently	20%
3	**Product Related (15 Marks)**	**60%**
4	Interpretation of result	20%
5	Conclusions	20%
6	Practical related questions	20%
	Total(25Marks)	**100%**

Marks obtained			Dated sign. Of Teacher
Process Related(10)	Product Related(15)	Total(25)	

EXPERIMENT NO – 6

Title -. Assemble / Dismantle micro Peloton turbine and micro – Francis turbine.

Practical Significance

The hydraulic machines which convert the hydraulic energy into mechanical energy are called turbines. At present the generation of hydraulic power is the cheapest as compared to the power generated by other sources such as oil, coal etc.

II. Relevant program outcomes (POs)

PO 2- **Discipline knowledge**: Apply Electrical engineering knowledge to solve broad-based electrical engineering related problems.

PO 3- **Experiments and practice**: Plan to perform experiments and practices to use the results to solve broad-based Electrical engineering problems.

PO 8-**Individual and team work**: Function effectively as a leader and team member in diverse/multidisciplinary teams.

III. Competency and Skills

This practical is expected to develop the following skills for the industry identified competency **Use principles of thermal engineering to maintain thermal related equipment**.

(i) Maintain tool and equipment.

(ii) Practice energy conservation.

IV Relevant Course Outcome (s)

Check the broad based working of diesel engines and gas turbines.

V Practical Outcome

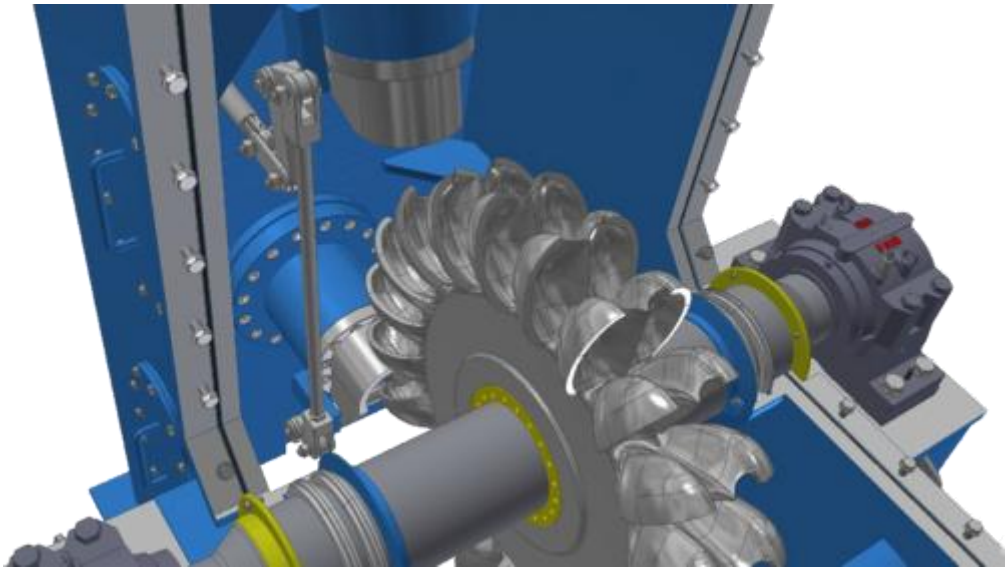
Identify the components of four stroke diesel engine model.

VI Minimum Theoretical Background

Pelton turbine is a tangential flow impulse turbine. The energy available at the inlet of turbine is only kinetic energy and this turbine is used for high heads. The inward flow reaction turbine having radial discharge at outlet is known as Francis turbine.

VII Setup (Model)

a) Pelton turbine



b)Francis Turbinne

VIII Resources Required

Name of boiler	Specification	Qty

IX Precautions to be followed

(i) Use safety shoes.

(ii) Maintain tools and equipments.

X Procedure to be followed

(i) Select the turbine model for demonstration

(ii) Dismantle the same using suitable tools.

(iii) Locate different damage/failure areas in given turbine

(iv) Locate different components of given turbine.

(v) Assemble the same again.

XI Resources Used

S.r. No	Name of Resource	Broad Specification			Remark (if any)
		Make	Details	Qty	

XII Actual Procedure followed

XIII Precautions followed

XIV Observations and Calculations

Type of turbine selected- Micro- Pelton Turbine

S.N	Components	Type	Material	Tools used	Possible Failure
1					
2					
3					
4					
5					

Type of turbine selected- Micro-Reaction Turbine

S.N	Components	Type	Material	Tools used	Possible Failure
1					
2					
3					
4					
5					

XV Results

XVI Interpretation of Results (Giving meaning to results)

XVII Conclusions (Actions to be taken based on the interpretations)

XVII- Practical Related Questions

Note- Below given are few sample questions for reference. Teachers must design more such questions so as to ensure to achievement of identified Cos

Q1 List the working principle of Pelton turbine

Q2 List the working principle of Francis turbine

Q3 Mention applications of peloton turbine and Francis turbine

XIX Assessment Scheme

	Performance Indicators	**Weightage**
	Process Related (10 Marks)	**(40%)**
1	Simulating various parameters within appropriate range satisfactorily	20%
2	Tabulate results independently	20%
3	**Product Related (15 Marks)**	**60%**
4	Interpretation of result	20%
5	Conclusions	20%
6	Practical related questions	20%
	Total(25Marks)	**100%**

Marks obtained			Dated sign. Of Teacher
Process Related(10)	Product Related(15)	Total(25)	

EXPERIMENT NO – 7

Title -Perform test on centrifugal pump to calculate overall efficiency

Practical Significance

Centrifugal pumps are used in agriculture fields, industrial purpose, power plants etc. Students are expected to know the construction and working of centrifugal pump to calculate the different efficiencies.

II. Relevant program outcomes (POs)

PO 2- **Discipline knowledge**: Apply Electrical engineering knowledge to solve broad-based electrical engineering related problems.

PO 3- **Experiments and practice**: Plan to perform experiments and practices to use the results to solve broad-based Electrical engineering problems.

PO 8-**Individual and team work**: Function effectively as a leader and team member in diverse/multidisciplinary teams.

III. Competency and Skills

This practical is expected to develop the following skills for the industry identified competency **Use principles of thermal engineering to maintain thermal related equipment**.

(i) Maintain tool and equipment.

(ii)Practice energy conservation.

IV Relevant Course Outcome (s)

Check the broad based working of different types of pumps

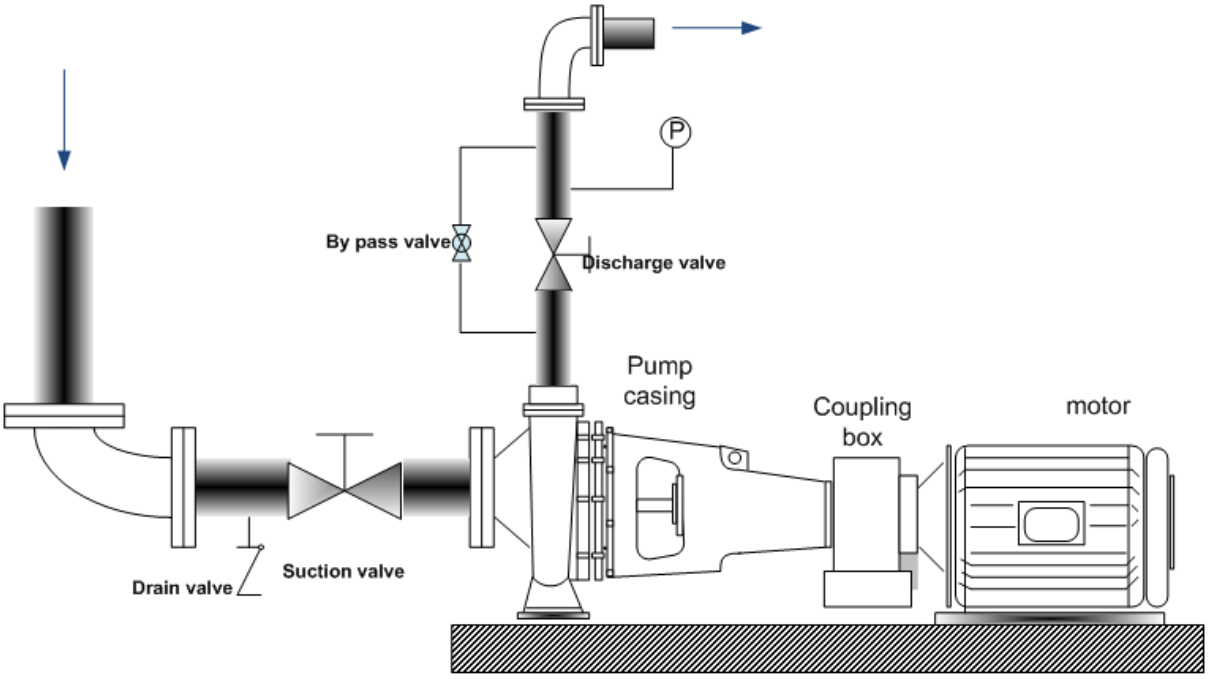
V Practical Outcome

Perform test on centrifugal pump to calculate overall efficiency

VI Minimum Theoretical Background

In centrifugal pump water enters in the impeller through eye of pump (a passage along the shaft at the center of the impeller) When fluid is coming in contact with rotating impeller, it gains kinetic energy and moves towards periphery by means of centrifugal force. This KE is converted into useful pressure energy at the outlet of centrifugal pump by providing gradually increased flow passage area in the casing.

VII Setup (Model)



Centrifugal pump system

VIII Resources Required

Name of Pump	Specification	Qty

IX Precautions to be followed

(i)Use safety shoes.

(ii) Maintain tools and equipments.

X Procedure

(i) Prime the pump properly

(ii) Check the proper electrical connections and mechanical set up

(iii) Switch on the pump & wait for 2 to 3 minutes

(iv) Collect the discharge of liquid in measuring tank & measure the rise of water level after t seconds(about 20 -30 seconds)

(v)Record suction pressure and delivery pressure

(vii) Measure number of blinks per min with energy meter.

XI Resources Used

S.r. No	Name of Resource	Broad Specification			Remark (if any)
		Make	Details	Qty	

XII Actual Procedure followed

XIII Precautions followed

XIV Observations and Calculations

(i) Cross sectional area rectangular measuring tank
(ii) Efficiency of electric motor
(iii) Take mass density of water 1000Kg/cu.m

Sr. N	Suction Pressure P1	Pressure Head At inlet H1 = P1/w	**Delivery pressure(P2)**	**Pressure Head at Outlet H2=P2/w**	**Rise in water level in tank H**	**Time of water collection in tank T**	**No. of Nlinks per minute(n)**
1							
2							
3							
4							
5							

Sample Calculations

For reading no. -----

a) The input power to the pump
Input power = Energy supplied in KJ per sec X efficiency of electric motor

= {(n X 3600)/60 X 3200 } X efficiency of electric motor KW

b) Volume of water collected in measuring tank. V
V = cross section area at tank X Rise in level of water in Tank
= A X H = ------- cu.m

Discharge ,Q = (Volume of water collected)/ (Time of water collection) = V/T

c) Manometric Head = Hm
Hm = Pressure head at outlet of pump - Pressure head at inlet of pump
= H2 –(-H1) =H2 + H1

d) The output power from the pump
O/P power = (wQHm)/1000 = …… Kw

e) Overall efficiency of centrifugal pump = (Output power)/ (Input power)

XV Results

Sr.No.	I/P power KW	Discharge Q	Manometric Head Hm	O/p power KW	Overall efficiency
1					
2					
3					
4					
5					

XVI Interpretation of Results (Giving meaning to results)

XVII Conclusions (Actions to be taken based on the interpretations)

XVII- Practical Related Questions

Note- Below given are few sample questions for refrence. Teachers must design more such questions so as to ensure to achievement of identified Cos

Q1 Define suction head, delivery head and manometric head

Q2 Mention different efficiencies related to centrifugal pump

Q3 List the application of centrifugal pump

Q4 State the need of priming.

XIX Assessment Scheme

	Performance Indicators	**Weightage**
	Process Related (10 Marks)	**(40%)**
1	Simulating various parameters within appropriate range satisfactorily	20%
2	Tabulate results independently	20%
3	**Product Related (15 Marks)**	**60%**
4	Interpretation of result	20%
5	Conclusions	20%
6	Practical related questions	20%
	Total(25Marks)	**100%**

Marks obtained			Dated sign. Of Teacher
Process Related(10)	Product Related(15)	Total(25)	

EXPERIMENT NO – 8

Title -.. Assemble / Dismantle reciprocating air compressor, screw compressor and centrifugal compressor

Practical Significance

Compressors are used to compress air ,gas or vapor. There are many uses of compressed air such as to drive air engines, to operate pneumatic machine tools and variety of other devices.

II. Relevant program outcomes (POs)

PO 2- **Discipline knowledge**: Apply Electrical engineering knowledge to solve broad-based electrical engineering related problems.

PO 3- **Experiments and practice**: Plan to perform experiments and practices to use the results to solve broad-based Electrical engineering problems.

PO 8-**Individual and team work**: Function effectively as a leader and team member in diverse/multidisciplinary teams.

III. Competency and Skills

This practical is expected to develop the following skills for the industry identified competency **Use principles of thermal engineering to maintain thermal related equipment**.

(i) Maintain tool and equipment.

(ii) Practice energy conservation.

IV Relevant Course Outcome (s)

Check the broad based working of diesel engines and gas turbines.

V Practical Outcome

Assemble / Dismantle reciprocating air compressor, screw compressor and centrifugal compressor

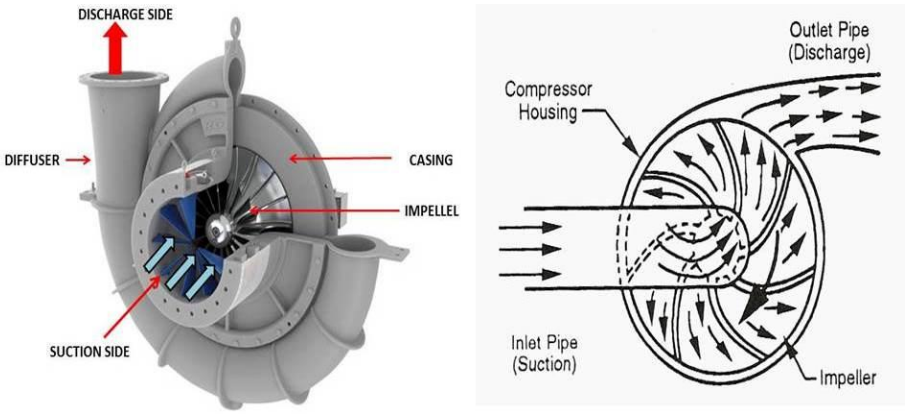
VI Minimum Theoretical Background

A machine which takes air or gas during suction stroke at low pressure and then compresses it to high pressure by a certain arrangement is known as compressor.

VII Setup (Model)

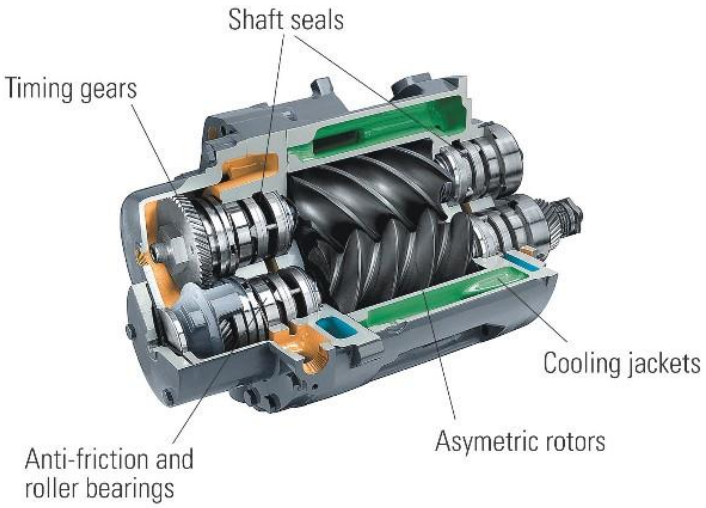
a) Reciprocating compressor

b)Centrifugal compressor



CENTRIFUGAL COMPRESSOR

C) Screw compressor



VIII Resources Required

Name of boiler	Specification	Qty

IX Precautions to be followed

(i)Use safety shoes.
(ii) Maintain tools and equipments.

X Procedure to be followed

(i) Select the compressor model for demonstration.

(ii) Dismantle the same using suitable tools.

(iii) Locate different damage/failure areas in given compressor.

(iv) Locate different components of given turbine.

(v) Assemble the same again.

XI Resources Used

S.r. No	Name of Resource	Broad Specification			Remark (if any)
		Make	Details	Qty	

XII Actual Procedure followed

XIII Precautions followed

XIV Observations and Calculations

XV Results

XVI Interpretation of Results (Giving meaning to results)

XVII Conclusions (Actions to be taken based on the interpretations)

XVII- Practical Related Questions

Note- Below given are few sample questions for reference. Teachers must design more such questions so as to ensure to achievement of identified Cos

Q1 List the working principle of Pelton turbine

Q2 List the working principle of Francis turbine

Q3 Mention applications of peloton turbine and Francis turbine

XIX Assessment Scheme

	Performance Indicators	**Weightage**
	Process Related (10 Marks)	**(40%)**
1	Simulating various parameters within appropriate range satisfactorily	20%
2	Tabulate results independently	20%
3	**Product Related (15 Marks)**	**60%**
4	Interpretation of result	20%
5	Conclusions	20%
6	Practical related questions	20%
	Total(25Marks)	**100%**

Marks obtained			Dated sign. Of Teacher
Process Related(10)	Product Related(15)	Total(25)	

EXPERIMENT NO – 9

Title Identify the components of refrigeration system(VCC)

Practical Significance

The latent heat of vaporization is utilized for absorbing the heat at low temperature from the refrigerated space .Refrigeration system is used for domestic as well as industrial applications. Students are expected to know the components arranged in refrigeration system. Students will enable to know the working of components in refrigeration system.

II. Relevant program outcomes (POs)

PO 2- **Discipline knowledge**: Apply Electrical engineering knowledge to solve broad-based electrical engineering related problems.

PO 3- **Experiments and practice**: Plan to perform experiments and practices to use the results to solve broad-based Electrical engineering problems.

PO 8-**Individual and team work**: Function effectively as a leader and team member in diverse/multidisciplinary teams.

III. Competency and Skills

This practical is expected to develop the following skills for the industry identified competency **Use principles of thermal engineering to maintain thermal related equipment**.

(i) Maintain tool and equipment.

(ii) Practice energy conservation.

IV Relevant Course Outcome (s)

Check the broad based working of refrigeration and air-conditioning systems

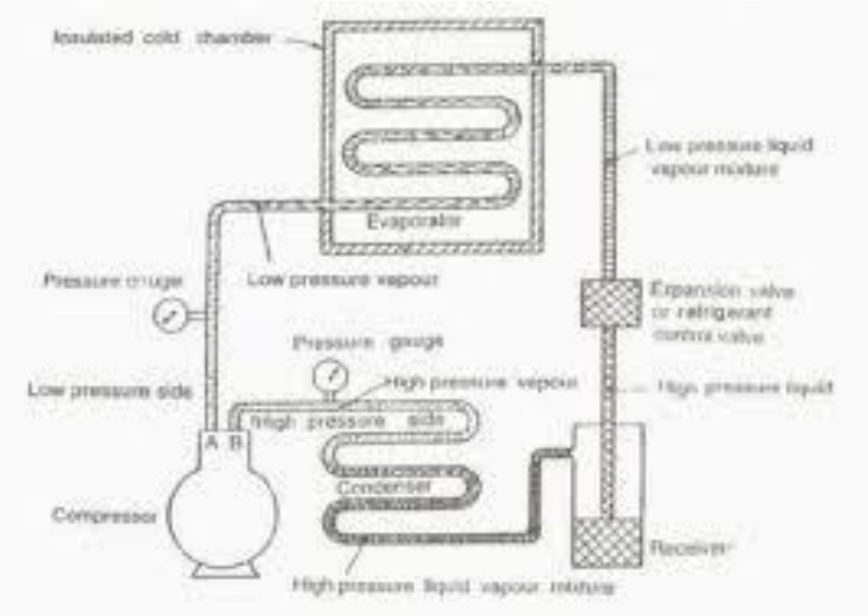
V Practical Outcome

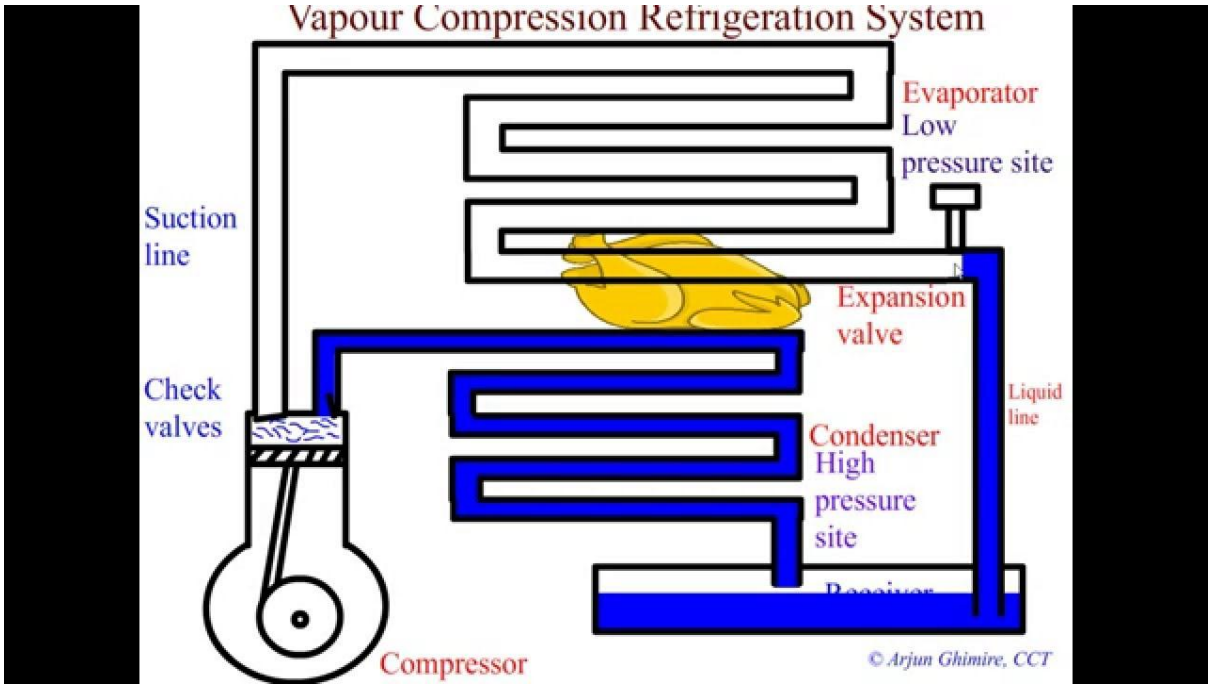
Identify the components of refrigeration system (VCC)

VI Minimum Theoretical Background

In vapor compression refrigeration system ,the refrigerant used alternatively undergoes a change of phase from vapor to liquid and liquid to vapor during the cycle.

VII Setup (Model)





VIII Resources Required

Name of boiler	Specification	Qty

IX Precautions to be followed

(i) Use safety shoes.

(ii) Maintain tools and equipments

X Procedure to be followed

(i) Select the refrigeration system for demonstration.

(ii) Locate the different parts and its sequence

(iii) Discuss the function of each component.

(iv) Draw the schematic arrangement

(v) Discuss the applications of refrigeration system

XI Resources Used

S.r. No	Name of Resource	Broad Specification			Remark (if any)
		Make	Details	Qty	

XII Actual Procedure followed

XIII Precautions followed

XIV Observations and Calculations

XV Results

XVI Interpretation of Results (Giving meaning to results)

XVII Conclusions (Actions to be taken based on the interpretations)

XVII- Practical Related Questions

Note- Below given are few sample questions for reference. Teachers must design more such questions so as to ensure to achievement of identified COs.

Q1 State the function of (i) Compressor (ii) Evaporator (iii) Condenser

Q2 Draw the sketch of refrigeration system

Q3 What do you mean by the term Ton of refrigeration

Q4 What do you mean by the term Hermetically sealed compressor

XIX Assessment Scheme

	Performance Indicators	**Weightage**
	Process Related (10 Marks)	**(40%)**
1	Simulating various parameters within appropriate range satisfactorily	20%
2	Tabulate results independently	20%
3	**Product Related (15 Marks)**	**60%**
4	Interpretation of result	20%
5	Conclusions	20%
6	Practical related questions	20%
	Total(25Marks)	**100%**

Marks obtained			Dated sign. Of Teacher
Process Related(10)	Product Related(15)	Total(25)	

EXPERIMENT NO – 10

Title - Identify the components of air conditioning system (VCC)

Practical Significance

The air conditioning is that branch of engineering science which deals with the study of conditioning of air for human comfort. It has different applications in conditioning of air for industrial purpose, food processing ,storage of food and other materials.

II. Relevant program outcomes (POs)

PO 2- **Discipline knowledge**: Apply Electrical engineering knowledge to solve broad-based electrical engineering related problems.

PO 3- **Experiments and practice**: Plan to perform experiments and practices to use the results to solve broad-based Electrical engineering problems.

PO 8-**Individual and team work**: Function effectively as a leader and team member in diverse/multidisciplinary teams.

III. Competency and Skills

This practical is expected to develop the following skills for the industry identified competency **Use principles of thermal engineering to maintain thermal related equipment**.

(i) Maintain tool and equipment.

(ii) Practice energy conservation.

IV Relevant Course Outcome (s)

Check the broad based working of refrigeration and air-conditioning systems

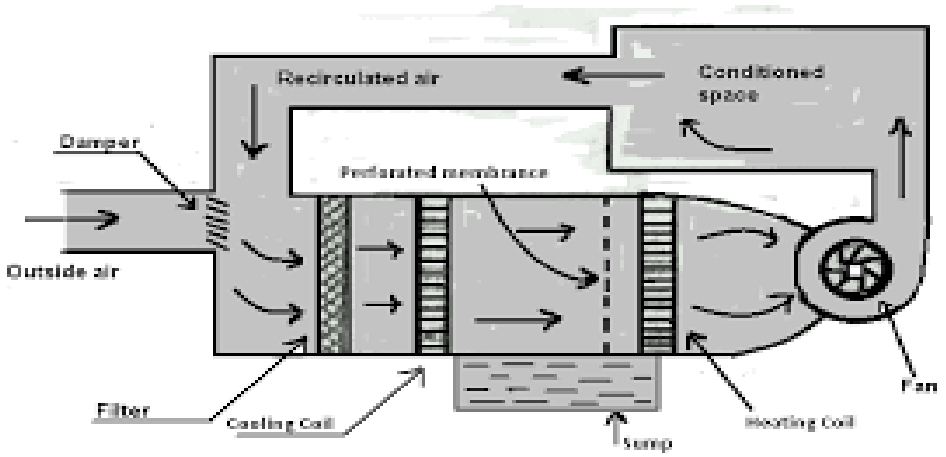
V Practical Outcome

Identify the components of air conditioning system (VCC)

VI Minimum Theoretical Background

The factors which affect the comfort of air conditioning are temperature of air, humidity of air, purity of air and motion of air.

VII Setup (Model)



SUMMER AIR CONDITIONING SYSTEM

VIII Resources Required

Name of boiler	Specification	Qty

IX Precautions to be followed

(i)Use safety shoes.

(ii) Maintain tools and equipments.

X Procedure to be followed

(i) Select the compressor model for demonstration.

(ii) Dismantle the same using suitable tools.

(iii) Locate different damage/failure areas in given compressor.

(iv) Locate different components of given turbine.

(v)Assemble the same again.

XI Resources Used

S.r. No	Name of Resource	Broad Specification			Remark (if any)
		Make	Details	Qty	

XII Actual Procedure followed

XIII Precautions followed

XIV Observations and Calculations

XV Results

XVI Interpretation of Results (Giving meaning to results)

XVII Conclusions (Actions to be taken based on the interpretations)

XVII- Practical Related Questions

Note- Below given are few sample questions for refrence. Teachers must design more such questions so as to ensure to achievement of identified Cos

Q1 List the types of air conditioning system.

Q2 Mention the working principle of air conditioning system

Q3 Applications of air conditioning system

	Performance Indicators	Weightage
	Process Related (10 Marks)	**(40%)**
1	Simulating various parameters within appropriate range satisfactorily	20%
2	Tabulate results independently	20%
3	**Product Related (15 Marks)**	**60%**
4	Interpretation of result	20%
5	Conclusions	20%
6	Practical related questions	20%
	Total(25Marks)	**100%**

Marks obtained			Dated sign. Of Teacher
Process Related(10)	Product Related(15)	Total(25)	