DIPLOMA IN REFRIGERATION & AIR CONDITIONING

CENTRALIZED QUESTION BANK

1020234440 - SENSORS AND ACTUATORS

DIRECTORATE OF TECHNICAL EDUCATION GOVERNMENT OF TAMILNADU

DIPLOMA END SEMESTER / YEAR EXAMINATION – 2025

Course: Refrigeration & Air conditioning

Subject : Sensors and actuators   **QP Code :** 1020234440

Time : 3 Hours   **Date :**   **Session:**   **Max Marks:** 100

Answer the following Questions

TEMPERATURE MEASUREMENT

Activities to Perform:

i) Construct a circuit to measure Temperature of Liquid using Thermistor or Thermocouple or RTD.

ii) Also find the graphical relationship between input and output.

Allocation of Marks

Sl. No	Description	Max Marks
1	Aim & Apparatus Required	5
2	Circuit Diagram	20
3	Connections and Execution	25
4	Output/ Result	10
5	Written Test (Theory Portions)	30
6	Viva Voce	10
	Total	**100**

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Answer the following Questions

BEHAVIOUR OF PROXIMITY SENSORS

Activities to Perform:
  i) Observe the behaviour of Inductive proximity sensor and Capacitive Proximity
      sensor for different material samples.
  ii) Interface relay and buzzer with sensors to test the output.

Allocation of Marks

Sl. No	Description	Max Marks
1	Aim & Apparatus Required	5
2	Circuit Diagram	20
3	Connections and Execution	25
4	Output/ Result	10
5	Written Test (Theory Portions)	30
6	Viva Voce	10
	Total	**100**

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Time : 3 Hours　　　**Date :**　　　　　**Session:**　　　　　**Max Marks:** 100

Answer the following Questions

LVDT

Activities to Perform:

i)　Construct a circuit for Measurement of Linear Displacement using LVDT.

ii)　Find the graphical relationship between input and output.

Allocation of Marks

Sl. No	Description	Max Marks
1	Aim & Apparatus Required	5
2	Circuit Diagram	20
3	Connections and Execution	25
4	Output/ Result	10
5	Written Test (Theory Portions)	30
6	Viva Voce	10
	Total	**100**

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Answer the following Questions

PERFORMANCE OF LIGHT SENSOR

Activities to Perform:

i)   Construct a circuit to obtain the VI characteristics and Response Characteristics of Photoconductive Cell (LDR).

ii) Construct a circuit to measure the speed of the motor using Optical Sensor.

Allocation of Marks

Sl. No	Description	Max Marks
1	Aim & Apparatus Required	5
2	Circuit Diagram	20
3	Connections and Execution	25
4	Output/ Result	10
5	Written Test (Theory Portions)	30
6	Viva Voce	10
	Total	**100**

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Answer the following Questions

PERFORMANCE OF ULTRASONIC AND MOISTURE SENSORS

Activities to Perform:

i) Interface Ultrasonic sensor with Arduino and measure the distance of the object.
ii) Interface Moisture sensor with Arduino and measure the moisture content in the soil.

Allocation of Marks

Sl. No	Description	Max Marks
1	Aim & Apparatus Required	5
2	Circuit Diagram	20
3	Connections and Execution	25
4	Output/ Result	10
5	Written Test (Theory Portions)	30
6	Viva Voce	10
	Total	**100**

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Answer the following Questions

OBSERVE THE BEHAVIOUR OF TRANSISTOR AS A SWITCH

<u>Activities to Perform:</u>

i)   Construct a circuit to get ON/OFF control on DC Motor using Push Button, SPST, SPDT and Limit Switch.

ii) Construct a circuit to get ON/OFF control on DC Motor using Transistor and Relay

Allocation of Marks

Sl. No	Description	Max Marks
1	Aim & Apparatus Required	5
2	Circuit Diagram	20
3	Connections and Execution	25
4	Output/ Result	10
5	Written Test (Theory Portions)	30
6	Viva Voce	10
	Total	**100**

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Time : 3 Hours   **Date :**   **Session:**   **Max Marks:** 100

Answer the following Questions

FORWARD AND REVERSE CONTROL OF AC MOTOR

Activities to Perform:

i) Connect Forward Reverse Control switch to change the direction of rotation of three phase induction motor.
ii) Demonstrate the Forward and Reverse operation of Motor.
iii) Measure the No-Load current in each phase using Tongue tester (Clamp Meter).

Allocation of Marks

Sl. No	Description	Max Marks
1	Aim & Apparatus Required	5
2	Circuit Diagram	20
3	Connections and Execution	25
4	Output/ Result	10
5	Written Test (Theory Portions)	30
6	Viva Voce	10
	Total	**100**

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Answer the following Questions

PNEUMATIC CIRCUIT FOR DOUBLE ACTING CYLINDER

Activities to Perform:

i) Construct a Pneumatic Circuit to control double acting pneumatic cylinder using 5/2 Solenoid Valve.

ii) Discuss the behaviour of cylinder as linear actuator.

Allocation of Marks

Sl. No	Description	Max Marks
1	Aim & Apparatus Required	5
2	Circuit Diagram	20
3	Connections and Execution	25
4	Output/ Result	10
5	Written Test (Theory Portions)	30
6	Viva Voce	10
	Total	**100**

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Answer the following Questions

OBSERVE THE BEHAVIOUR OF HYDRAULIC MOTOR

Activities to Perform:

  i)   Construct a Hydraulic Circuit to control Hydraulic Motor.

  ii) Observe the behaviour of Hydraulic Motor.

Allocation of Marks

Sl. No	Description	Max Marks
1	Aim & Apparatus Required	5
2	Circuit Diagram	20
3	Connections and Execution	25
4	Output/ Result	10
5	Written Test (Theory Portions)	30
6	Viva Voce	10
	Total	**100**

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Answer the following Questions

SERVO MOTOR CONTROL WITH AN ARDUINO

Activities to Perform:

i)   Construct an Arduino based circuit to sweeps the shaft of servo motor back and forth across 180 degree.

ii) Interface potentiometer with Arduino and based on its position get the control of servo motor shaft.

Allocation of Marks

Sl. No	Description	Max Marks
1	Aim & Apparatus Required	5
2	Circuit Diagram	20
3	Connections and Execution	25
4	Output/ Result	10
5	Written Test (Theory Portions)	30
6	Viva Voce	10
	Total	**100**