Scheme - G

Sample Test Paper-I

Course Name : Diploma in Mechanical Engineering

Course Code : ME/PG/PT

Semester : Fifth

17528

Subject Title : Measurements And Control

Marks : 25 **Time:1 hour**

Instructions:

1. All questions are compulsory.
2. Illustrate your answers with neat sketches wherever necessary.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.

Q1. Attempt any THREE **3 x 3= 9 Marks**

a) Define Hysteresis and Dead Zone.

b) Identify the types of error in the following situations.

i) A Vernier caliper with main scale zero not matching with the vernier scale zero.

ii) The speed of a pulley is reduced when a mechanical hand tachometer is pressed against its shaft with high pressure.

iii) A pressure gauge is not connected to its proper gauging point in a flow path.

c) Differentiate between thermocouple and thermistor.

d) State Optical Measurement Scale and Encoders.

Q2. Attempt any TWO **2 x 4= 8 Marks**

a) How linear potentiometer is used for measurement of displacement.

b) Explain the working principle of capacitive type of transducer with neat sketch.

c) Define: i) Speed of response ii) Fidelity iii) Dynamic error iv) Over- shoot.

Q3. Attempt any TWO **2 x 4= 8 Marks**

a) Explain the construction and principle of working of RVDT with the help of neat sketch.

b) A measuring system consists of transducer, amplifier and recorder with individual sensitivities as follows:

i. Transducer sensitivity = 0.25 mv/0c

ii. Amplifier gain = 2.5 v/m v

iii. Recorder sensitivity = 4 mm/ v

Calculate the overall sensitivity of the system.

c) Draw labelled sketch of Liquid in Glass Thermometer and Pressure Thermometer.

Scheme - G

Sample Test Paper-II

Course Name : Diploma in Mechanical Engineering

Course Code : ME/PG/PT

Semester : Fifth

17528

Subject Title : Measurements And Control

Marks : 25 **Time:1 hour**

Instructions:

1. All questions are compulsory.
2. Illustrate your answers with neat sketches wherever necessary.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.

Q1. Attempt any THREE **3 x 3= 9 Marks**

a) State the principle of Radiation and Optical Pyrometer.
b) State advantages and disadvantages of electronic control system.
c) Enlist direct and indirect liquid level measurement devices.

Q2. Attempt any TWO **2 x 4= 8 Marks**

a) Explain the working principle of eddy current dynamometer with suitable sketch to measure the torque.
b) Draw stress-strain curve for the metals and how this can be used for measurement.
c) Explain the difference between contact type and contactless type speed measurement devices. State two examples of each type

Q3. Attempt any ONE **1 x 8 = 8 Marks**

a) Draw a block diagram of closed loop control system. Describe its working for motor speed control.
b) Draw the neat label sketch of working principle Optical Pyrometer. State its advantages and disadvantages.

Scheme - G

Sample Question Paper

Course Name : Diploma in Mechanical Engineering

Course Code : ME/PG/PT

Semester : Fifth

17528

Subject Title : Measurements And Control

Marks : 100 **Time:3 hours**

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary
5. Preferably, write the answers in sequential order

Q1 (a). Attempt any THREE. **12 Marks**

i) Define the term “Accuracy”, “Precision”, “Range” and “Span”.

ii) Describe Repeatability and Reproducibility.

iii) How Low Pressure is measured by thermal conductivity gauge? Explain.

iv) List the devices used for pressure measurement (any eight).

Q1 (b). Attempt any ONE. **06 Marks**

i) Classify Transducers and explain any one with diagram.

ii) With the help of labeled sketch explain Displacement Measurement by LVDT.

Q2. Attempt any TWO. **16 Marks**

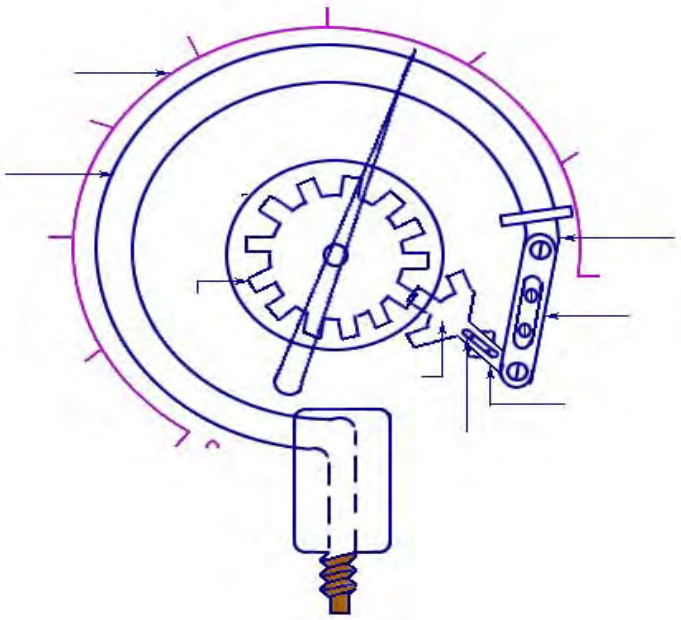
a) Draw block Diagram of generalized Measurement System, Label it. State functions and examples of any three elements in it.

b) Write down specifications, selections and application of Displacement Transducer.

c) List the electrical methods for Temperature Measurement. Explain temperature measurement by Thermister.

Q.3. Attempt any FOUR . **16 Marks**

a) Redraw and label the parts indicated by arrow in given Figure.



b) A thermometer has range 0°C to 100°C. It has accuracy of ± 1% of full scale value. Find the error in reading of 73°C.

c) Distinguish between Non-Electrical methods and Electrical methods for Temperature Measurements.

d) What is Bimetallic Thermometer? How metal at free end deflects as temperature change in it.

e) Explain the working principle of optical pyrometer with neat sketch.

Q4 (a). Attempt any THREE. **12 Marks**

a) State laws of intermediate temperature and intermediate metal with neat sketch.

b) Draw labeled sketch of Hot wire Anemometer and explain its working.

c) List Speed Measurement Devices. Which Device is used to measure the speed of Automobile.

d) How Sling Psychrometer is applied for Humidity Measurement.

Q4 (b). Attempt any ONE. **6 Marks**

a) Define with examples 1. Automatic Control System.

2. Closed Loop System.

3. Feedback Control System.

b) Compare Hydraulic and Pneumatic type of Control System (minimum six points.)

Q 5. Attempt any TWO. **16 Marks**

a) i) Draw neat sketch of Slipping Clutch tachometer and State its working Principle.

ii) A strain gauge is bonded to a beam which has length 10 cm and cross sectional area 4 cm^2. Modulus of elasticity of the material is 207 GN/m^2. The original resistance of the gauge is 240 ohm and gauge factor is 2.2. If applied load results into change in resistance of gauge equal to 0.013 ohm, determine change in length of the beam and the load applied.

b) i)Draw block Diagram of Feed forward Control System and State its working Principle.

ii) State functions of PID Controller.

c) i) State applications of Measurement and Control for Setup of Boiler and Air Conditioner.

ii) State four different modes of control actions used in Control System.

Q 6. Attempt any FOUR. **16 Marks**

a) List different Flow Transducers. Explain the working of Rotameter.

b) Differentiate between Orficemeter and Venturimeter.

c) Draw neat sketch of Ultrasonic Flow Meter and explain how flow is measured by using it.

d) Define Dynamometer. State its type and application of each.

e) Explain with neat sketch how Load Cell is used for Strain Measurement.